ANIMAL KNOWLEDGE

DK Penguin Random House

DK Delhi

Senior Editor Rupa Rao
Senior Art Editor Vikas Chauhan
Editorial Team Nandini Tripathy, Janashree Singha, Hina Jain
Art Editors Tanisha Mandal, Noopur Dalal,
Amisha Gupta, Devika Awasthi
Jacket Designer Juhi Sheth
Senior DTP Designer Vishal Bhatia
DTP Designers Vijay Kandwal, Rakesh Kumar
Project Picture Researcher Deepak Negi
Managing Jackets Editor Saloni Singh
Pre-Production Manager Balwant Singh
Production Manager Pankaj Sharma
Picture Research Manager Taiyaba Khatoon
Managing Editor Soma B Chowdhury
Managing Art Editor Govind Mittal
Editorial Head Glenda Fernandes
Design Head Malavika Talukder

DK London

Senior Editor Ashwin Khurana
Senior Designer Rachael Grady
Jacket Designer Akiko Kato
Jacket Design Development Manager Sophia MTT
Production Editor Kavita Varma
Production Controller Sian Cheung
Managing Editor Francesca Baines
Managing Art Editor Philip Letsu
Publisher Andrew Macintyre
Associate Publishing Director Liz Wheeler
Art Director Karen Self
Publishing Director Jonathan Metcalf

First published in Great Britain in 2021 by
Dorling Kindersley Limited
DK, One Embassy Gardens, 8 Viaduct Gardens,
London, SW11 7BW

The authorised representative in the EEA is
Dorling Kindersley Verlag GmbH. Arnulfstr. 124,
80636 Munich, Germany

Copyright © 2021 Dorling Kindersley Limited
A Penguin Random House Company

10 9 8 7 6 5 4 3 2 1
001–319141–Sept/2021

All rights reserved.
No part of this publication may be reproduced, stored in or introduced
into a retrieval system, or transmitted, in any form, or by any means
(electronic, mechanical, photocopying, recording, or otherwise),
without the prior written permission of the copyright owner.

A CIP catalogue record for this book
is available from the British Library.
ISBN: 978-0-2414-4653-9

Printed and bound in China

For the curious
www.dk.com

FSC
www.fsc.org
MIX
Paper from
responsible sources
FSC™ C018179

This book was made with Forest Stewardship
Council™ certified paper – one small step
in DK's commitment to a sustainable future.
For more information go to
www.dk.com/our-green-pledge

ANIMAL KNOWLEDGE GENIUS!

Written by: Stevie Derrick and Lizzie Munsey
Consultant: John Woodward

DK

CONTENTS

1 THE ANIMAL WORLD

What is an animal? 10
Bare bones 12
Under threat 14
Conservation 16

2 INVERTEBRATES

Invertebrates 20
Corals and jellies 22
Wiggly worms 24
Molluscs 26
Seashells 28
Molluscs on the move 30
Stars and spines 32
Armoured animals 34
Arachnids 36
Insects 38
Beetle mania 40
Butterflies and moths 42
Insect life cycles 44
Winged wonders 46
A bug's life 48
Hide and seek 50

3 FISH

Fish 54
Sharks and rays 56
Bony fish 58
Reef rovers 60
Fish bodies and fins 62

4 AMPHIBIANS

Amphibians 66
Frogs and toads 68
Salamanders and newts 70
New life 72

5 REPTILES

Reptiles 76
Turtles and tortoises 78
Lots of lizards 80
Ssssnakes 82
Scaly stories 84
Make it snappy 86

6 BIRDS

Birds 90
Grounded! 92
Game birds 94
Parrot parade 96
Flight 98
Toucans and woodpeckers 100
Night owls 102
Birds of prey 104
Whose beak? 106
Ducks and geese 108
Water birds 110
Clever claws 112
Coastal birds 114
Perching birds 116
Pretty plumage 118
Nests and eggs 120

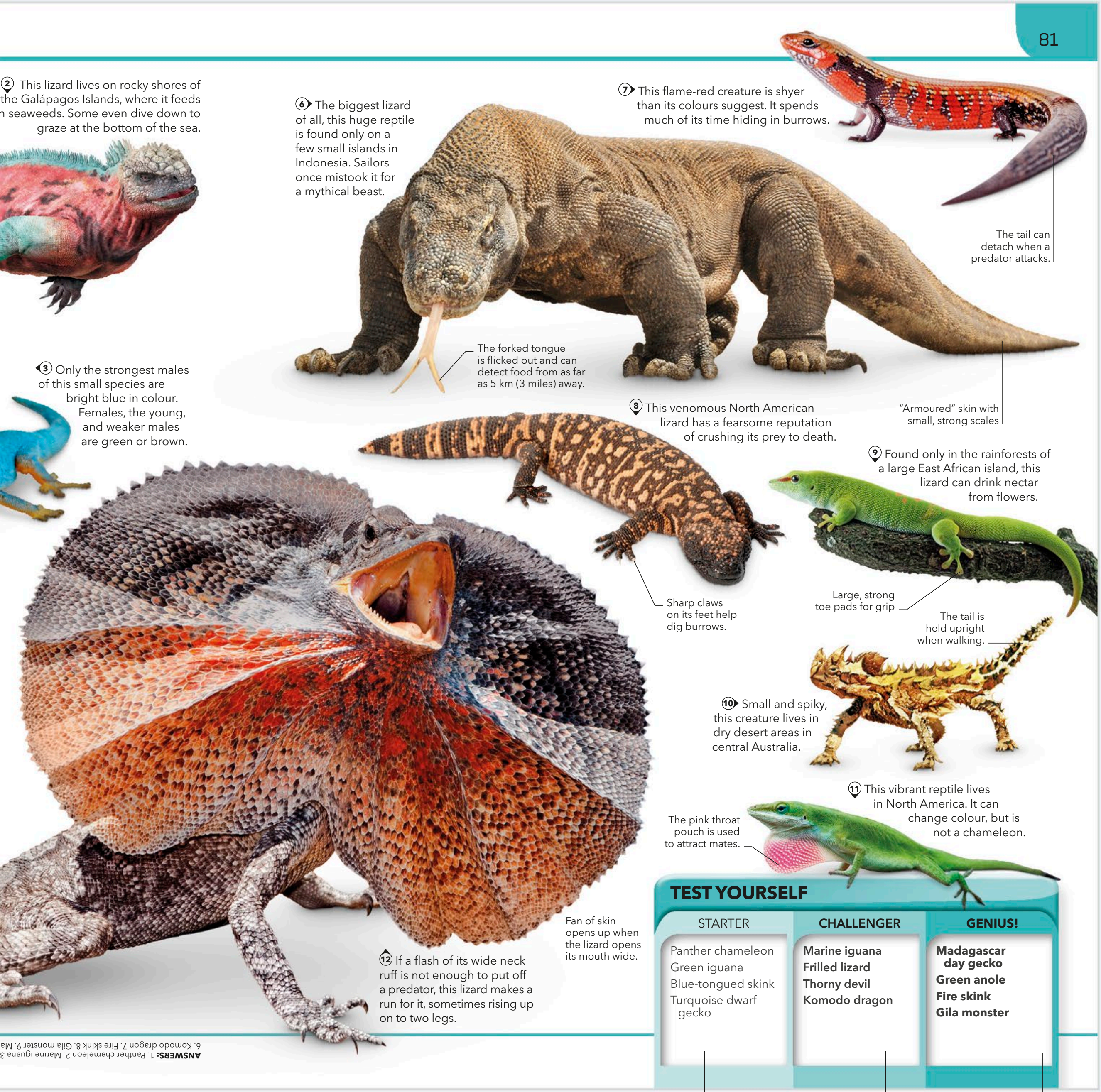
7 MAMMALS

Mammals 124
Marsupials 126
Insect eaters and sloths 128
Toothy rodents 130
Telling tails 132
Monkey business 134
Ape antics 136
Tree dwellers 138
Classy coats 140
Night life 142
Canine crew 144
Brilliant bats 146
Bear facts 148
Wild cats 150
Furry hunters 152
Bite size 154
Horsing around 156
Who left that? 158
Hoofed herds 160
Pig tales 162
Hooves and humps 164
Ocean mammals 166
Fin-footed fun 168
Whales and dolphins 170

Index 172
Acknowledgments 176

02. When you have chosen a quiz, take a careful look at the pictures. Can you identify all the animals? The clues will give you extra information to help you work things out.

03. Look at the "Test Yourself" panel and match the words and pictures. Don't write the answers in the book – you may want to quiz again later, to improve your score, or give it to a friend to see how they do.



81

② This lizard lives on rocky shores of the Galápagos Islands, where it feeds n seaweeds. Some even dive down to graze at the bottom of the sea.

⑥ The biggest lizard of all, this huge reptile is found only on a few small islands in Indonesia. Sailors once mistook it for a mythical beast.

⑦ This flame-red creature is shyer than its colours suggest. It spends much of its time hiding in burrows.

The tail can detach when a predator attacks.

③ Only the strongest males of this small species are bright blue in colour. Females, the young, and weaker males are green or brown.

The forked tongue is flicked out and can detect food from as far as 5 km (3 miles) away.

⑧ This venomous North American lizard has a fearsome reputation of crushing its prey to death.

"Armoured" skin with small, strong scales

⑨ Found only in the rainforests of a large East African island, this lizard can drink nectar from flowers.

Sharp claws on its feet help dig burrows.

Large, strong toe pads for grip

The tail is held upright when walking.

⑩ Small and spiky, this creature lives in dry desert areas in central Australia.

⑪ This vibrant reptile lives in North America. It can change colour, but is not a chameleon.

The pink throat pouch is used to attract mates.

Fan of skin opens up when the lizard opens its mouth wide.

⑫ If a flash of its wide neck ruff is not enough to put off a predator, this lizard makes a run for it, sometimes rising up on to two legs.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Panther chameleon	**Marine iguana**	**Madagascar day gecko**
Green iguana	**Frilled lizard**	**Green anole**
Blue-tongued skink	**Thorny devil**	**Fire skink**
Turquoise dwarf gecko	**Komodo dragon**	**Gila monster**

ANSWERS: 1. Panther chameleon 2. Marine iguana 3
6. Komodo dragon 7. Fire skink 8. Gila monster 9. Ma

04. Work your way through the three levels of difficulty – it's not supposed to be easy! When you think you have got them all, check the answers – they are upside-down at the bottom of the page.

Start off easy... These answers should be the easiest to work out.

Getting harder... How about these harder answers? Can you match them too?

Truly tricky If you can figure out these final answers it's official – you're a genius!

Threats to animals

Deforestation
When forests are cut down, the habitats of a wide range of animals are destroyed. This fire has been started to clear a rainforest for farming land.

Climate change
Human activity has warmed our planet. As Earth heats up, the ice caps melt, reducing the areas where animals such as penguins live.

Poaching and the pet trade
Although against the law, some animals, such as elephants, are killed for their body parts. Others, like macaws, are sold illegally as pets.

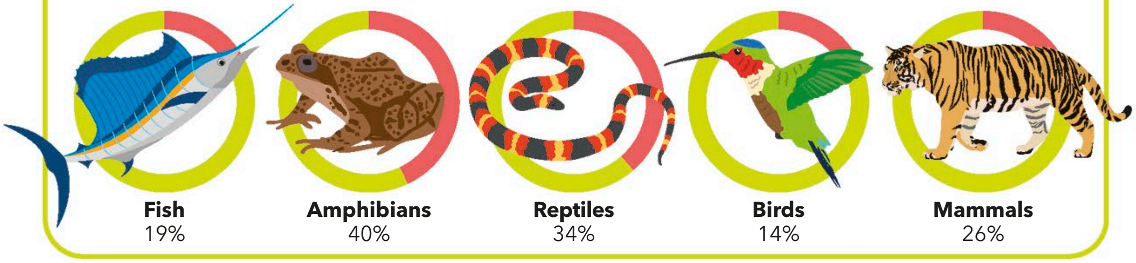
Construction
Dams provide cheap, renewable electricity. However, building them can flood valleys and block rivers, depriving or killing the animals, especially fish, there.

Under threat

Humans have changed the world around us. We farm the land, fish the oceans, and pollute the air with our cars and factories. This has had a negative impact on the natural world, with habitats destroyed and the survival of the animals that live in them threatened. For some species it is already too late – they have become extinct.

Species in danger

The International Union for Conservation of Nature (IUCN) has calculated the approximate percentage (shown below in red) of the five vertebrate animal types under threat. There are no similar measurements for invertebrates, but experts know they too face a crisis.



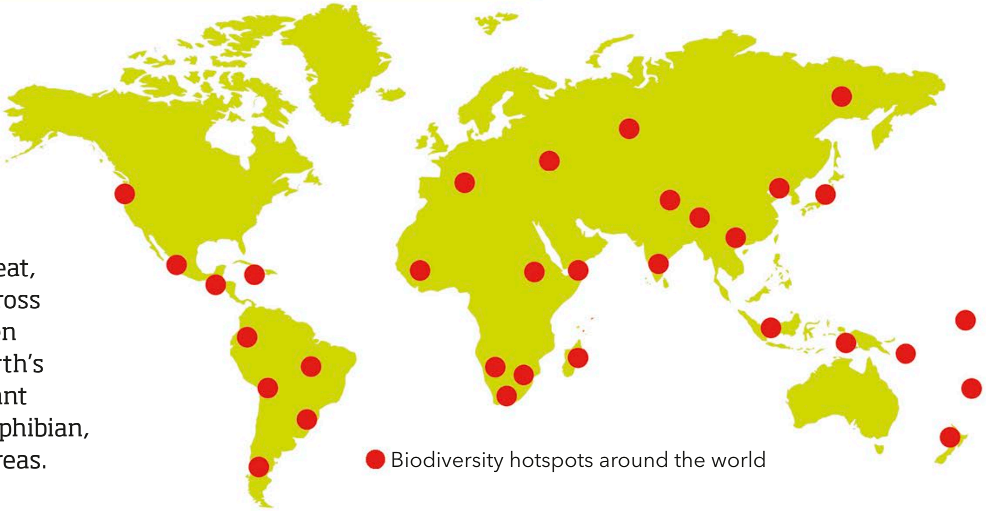
Breathing through the skin made this toad sensitive to heat and pollution in the air.

Gone forever

Golden toads lived in a small area of the rainforest in Costa Rica. When a change in climate made the area hotter and drier, the population fell sick with a fungal disease. By 1989, only one was found. Today, they are extinct.

Biodiversity hotspots

Some places on Earth have a variety of plants and animals that are not found elsewhere. Where these areas are under threat, they are known as biodiversity hotspots. Across the world, 36 biodiversity hotspots have been identified. They cover just 2.4 per cent of Earth's land surface but more than 50 per cent of plant species and 43 per cent of bird, mammal, amphibian, and reptile species are found only in these areas.



● Biodiversity hotspots around the world

Overfishing
Over time, humans have taken so many fish out of the oceans that many are now scarce. Some, like the smooth handfish, from Australia, have become extinct.

Disease and pesticides
Spraying pesticides kills insects that eat crops. But this upsets the fragile ecosystem as birds lose a source of food, and may be poisoned in turn.

I don't believe it!

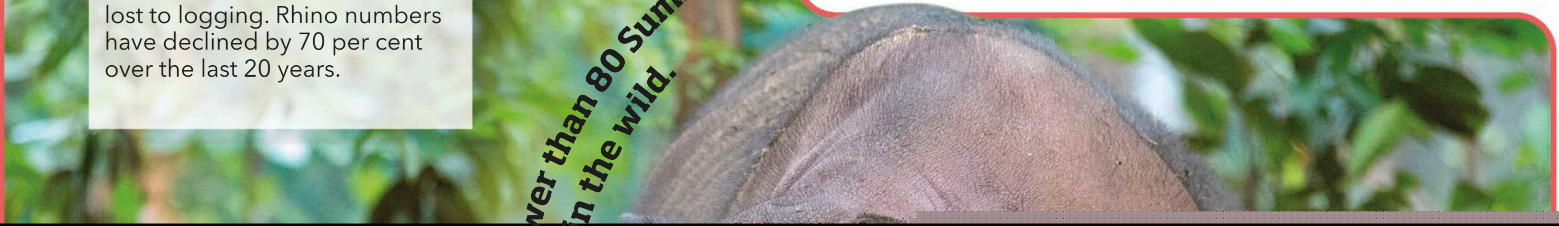
Humans have been driving animals to extinction for thousands of years. It is likely that hunting contributed to the extinction of megafauna (huge animals), such as woolly mammoths, more than 10,000 years ago.

Near extinction

The world's most endangered marine mammal is the vaquita, a small porpoise found only in the Gulf of California, USA. Some conservationists estimate that there may be fewer than 10 vaquitas left in the wild.

How the Sumatran rhinoceros has become critically endangered

01. Vast areas of tropical forest where the world's smallest rhino lives have been lost to logging. Rhino numbers have declined by 70 per cent over the last 20 years.



There are fewer than 80 Sumatran rhinos left in the wild.

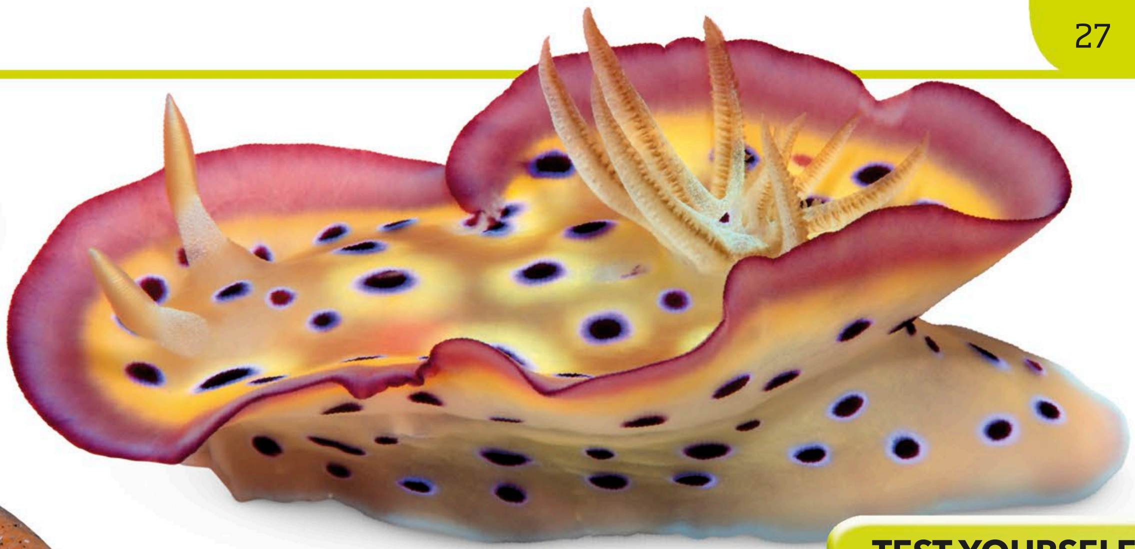
02. This deforestation has split up rhino populations, making it difficult for them to find a mate and breed.

03. The Sumatran rhino is also threatened by poachers, who hunt it for its two horns.

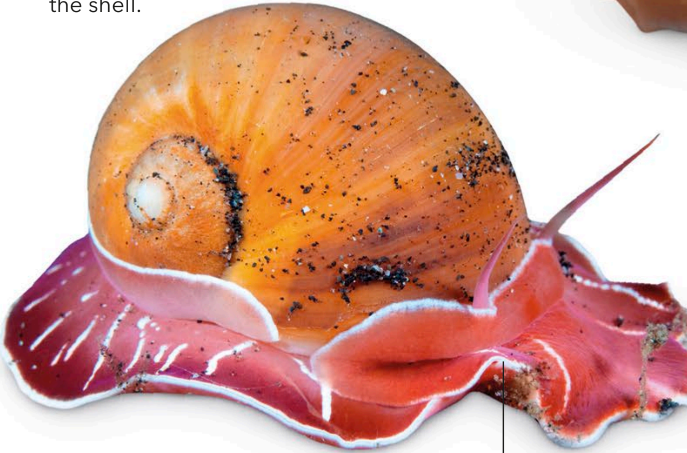
2

INVERTEBRATES

Huddle together
Most types of animals on Earth are invertebrates. They include insects such as these ladybirds, which have clumped together in thousands in a sheltered place to sleep through the cold winter, when there is nothing for them to eat.



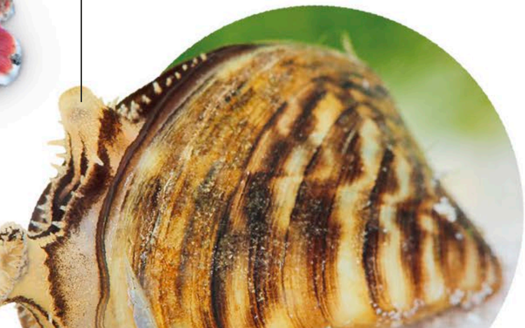
⑨ This large mollusc can be seen only at night. It is a fierce predator, and preys on clams by wrapping its big foot around them and boring into the shell.



The foot expands in size as it absorbs water.

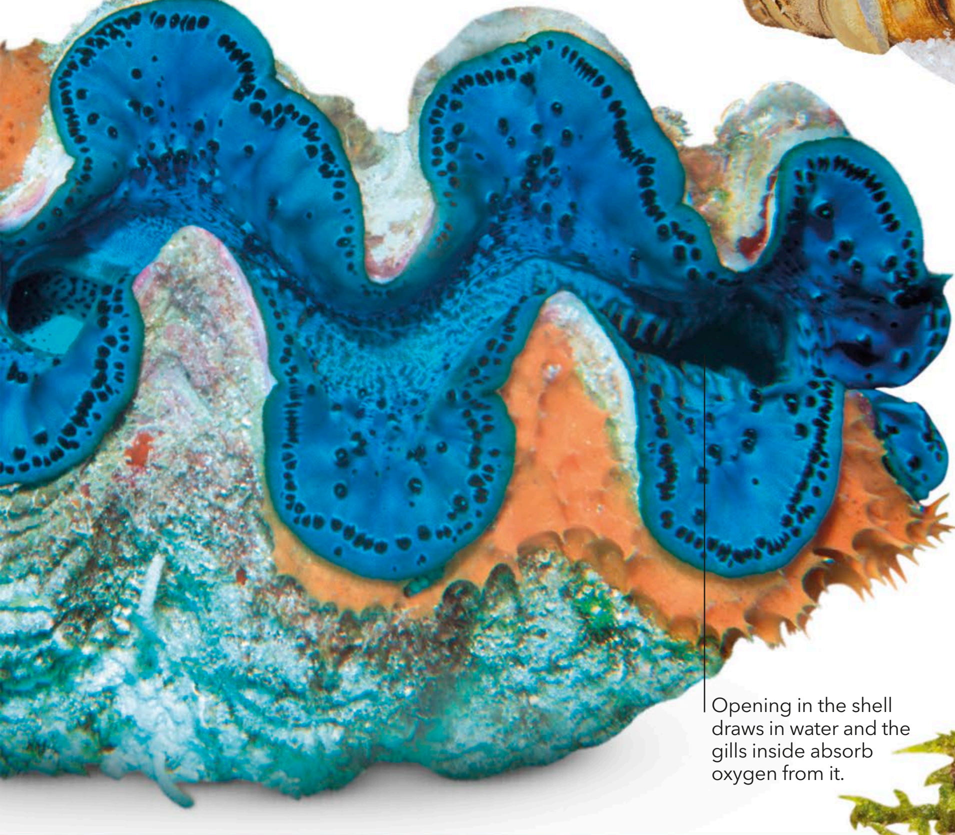
⑩ The bright colours on this spotted sea slug warn predators to stay away. Its name means "naked gills", after the tufts of feather-like gills on its back.

⑪ Living in shallow reefs, this brightly coloured mollusc has deep furrows in its shell. It feeds on food particles floating in water and waste products of algae that live in its soft tissue.



Siphon is used for feeding and breathing.

⑫ Zig-zag stripes run all across this freshwater animal's shell. Native to Eastern Europe, it attaches itself to rocks using small threads on its body.



Opening in the shell draws in water and the gills inside absorb oxygen from it.

TEST YOURSELF

STARTER

- Leopard slug
- Banana slug
- Leaf slug
- Maxima clam
- Zebra mussel

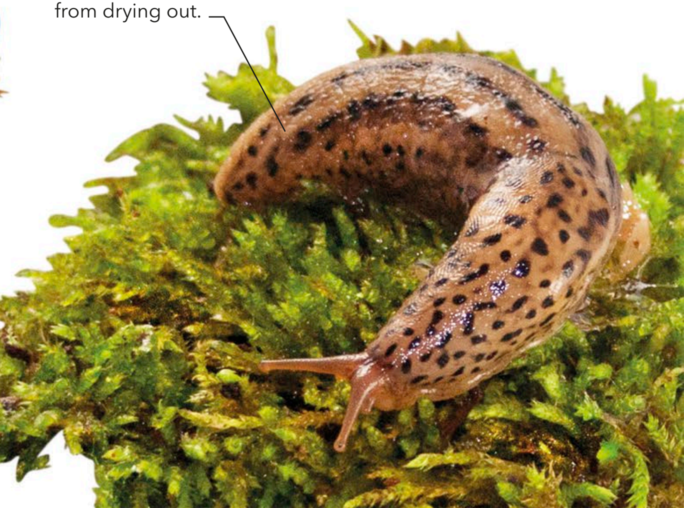
CHALLENGER

- **Giant African snail**
- **Garden slug**
- **Garden snail**
- **Sea bunny**

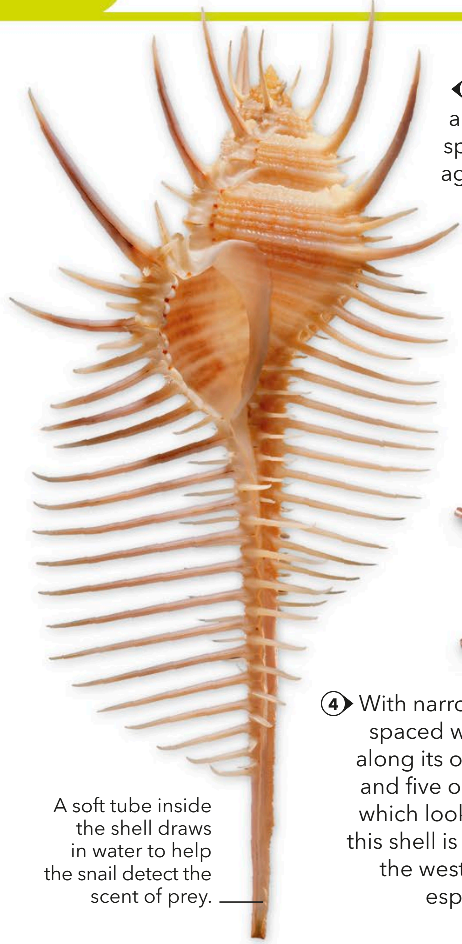
GENIUS!

- **Moon snail**
- **Dorid nudibranch**
- **Razor clam**
- **Spike-topped apple snail**

⑬ The black blotches on this creature's body resemble the pattern of a big cat's fur. It loves to eat plants and algae, but also feasts on other slugs.

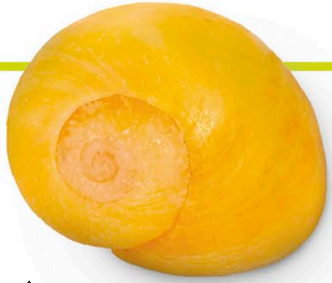


Slime all over its body prevents it from drying out.

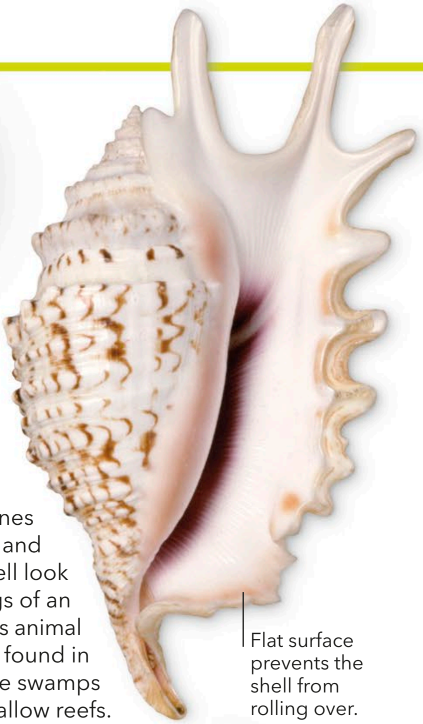


① Found in the Pacific and Indian Oceans, this spiky shell protects an aggressive sea snail. The spines deter predators, and also prevent the snail from sinking into the sand on the seabed.

A soft tube inside the shell draws in water to help the snail detect the scent of prey.

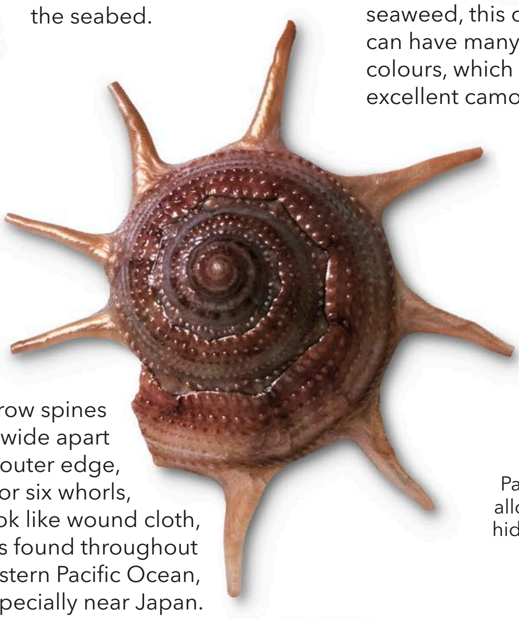


② Common on rocky shores, floating among seaweed, this creature's shell can have many different colours, which provide excellent camouflage.

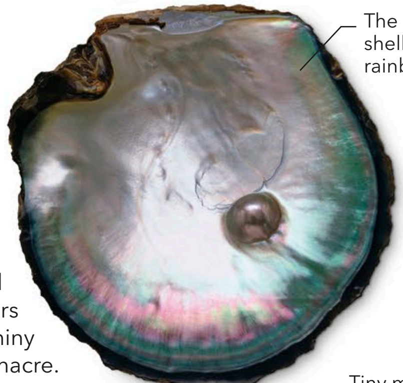


③ The long spines on this thick and heavy shell look like the legs of an arachnid. This animal is mostly found in mangrove swamps and shallow reefs.

Flat surface prevents the shell from rolling over.

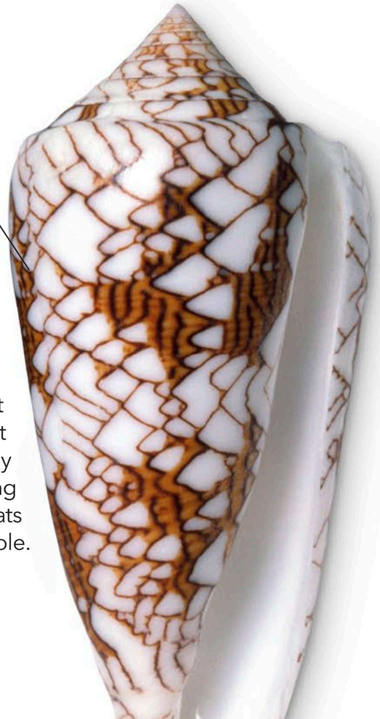


④ With narrow spines spaced wide apart along its outer edge, and five or six whorls, which look like wound cloth, this shell is found throughout the western Pacific Ocean, especially near Japan.



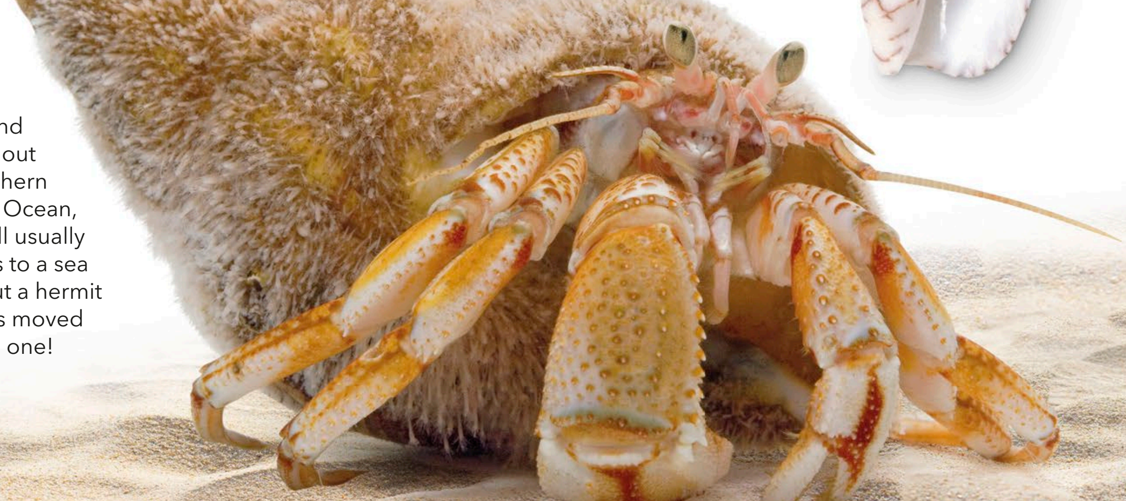
The lining inside the shell shimmers with rainbow colours.

⑤ This shell often contains a natural gem. The mollusc makes the gem from a grain of sand that enters its shell. To protect itself from irritation caused by the sand, it covers the grain with a shiny substance called nacre.



Pattern on the shell allows the animal to hide from predators in the sand.

⑥ Inside this shell is one of the most deadly molluscs. It harpoons its prey with a paralysing venom, then eats it whole.



Tiny marine organisms growing on the shell give it a furry appearance.

⑦ Found throughout the northern Atlantic Ocean, this shell usually belongs to a sea snail, but a hermit crab has moved into this one!

TEST YOURSELF

STARTER

- Atlantic sea scallop
- Venus comb murex
- Pearl oyster
- West Indian worm shell
- Sundial shell

CHALLENGER

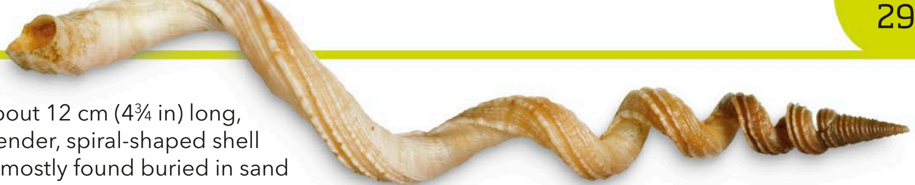
- **Triumphant star turban**
- **Violet spider conch shell**
- **Flat periwinkle**
- **Common northern whelk shell**
- **Textile cone**
- **Scotch bonnet**

GENIUS!

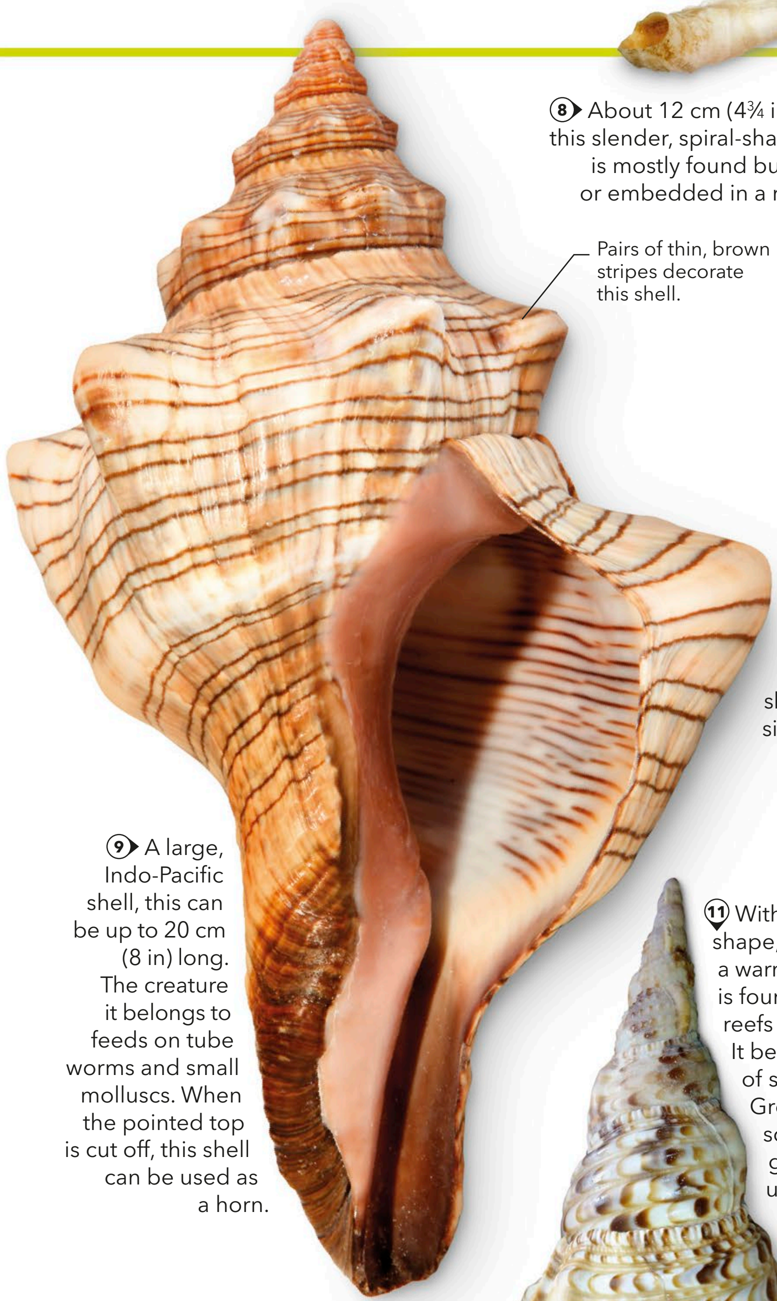
- **Fly-spotted augur shell**
- **Trapezium horse conch**
- **Banded wedge shell**
- **Atlantic triton**

Seashells

Belonging to different ocean molluscs, including snails, oysters, and clams, seashells are hard exoskeletons that protect the soft bodies of the creatures inside from harm. Made of calcium carbonate, the same material as eggshells, these suits of armour come in all shapes and sizes.

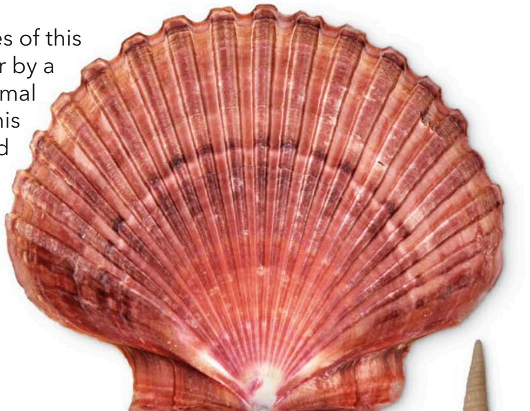


⑧ About 12 cm (4¾ in) long, this slender, spiral-shaped shell is mostly found buried in sand or embedded in a marine sponge.

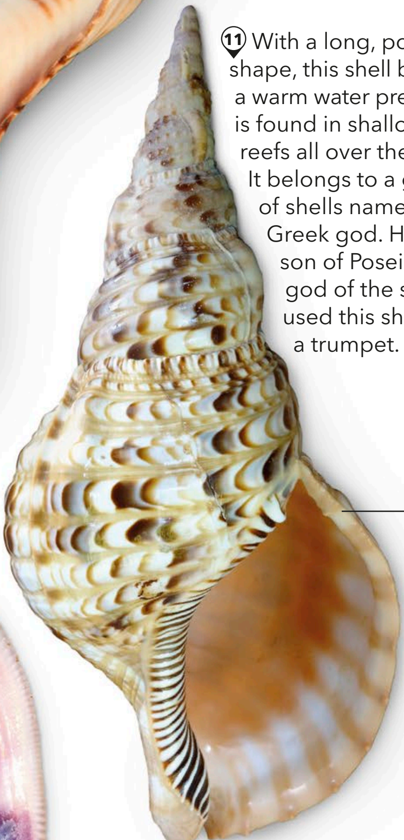


Pairs of thin, brown stripes decorate this shell.

⑨ A large, Indo-Pacific shell, this can be up to 20 cm (8 in) long. The creature it belongs to feeds on tube worms and small molluscs. When the pointed top is cut off, this shell can be used as a horn.

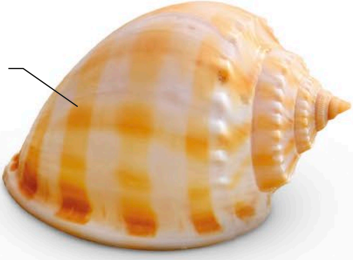


⑩ The two halves of this shell are held together by a single muscle. The animal swims by using this muscle to open and close the shell.



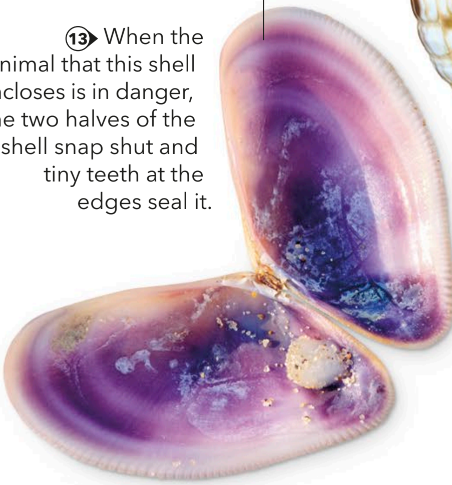
⑪ With a long, pointed shape, this shell belongs to a warm water predator. It is found in shallow, sandy reefs all over the world. It belongs to a group of shells named after a Greek god. He was the son of Poseidon, the god of the sea, and used this shell as a trumpet.

Large bottom whorl



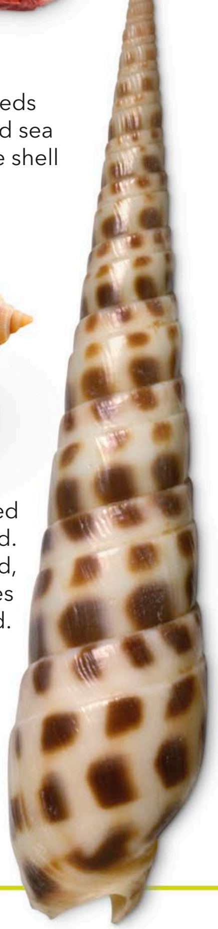
⑫ This shell belongs to a carnivorous sea snail that feeds on sea stars, sea urchins, and sea biscuits. It is the official state shell of North Carolina, USA.

Tartan-like pattern

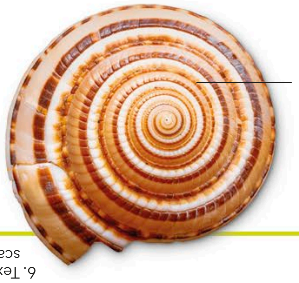


Colourful stripes line the edge of the shell.

⑬ When the animal that this shell encloses is in danger, the two halves of the shell snap shut and tiny teeth at the edges seal it.



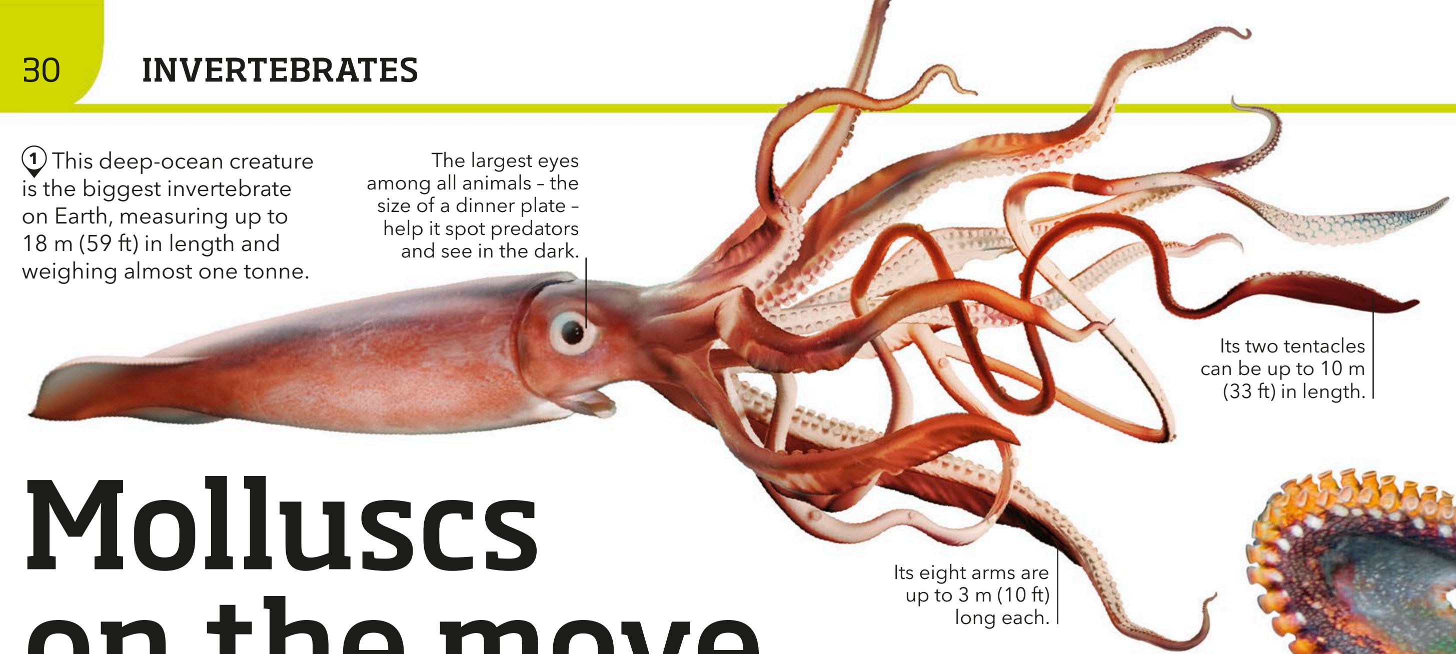
⑭ This sharply pointed shell is named after a tool used for boring into wood. It burrows through the soft seabed, looking for food. The dark blotches camouflage it in rocky sand.



⑮ With a pattern resembling a spiral staircase, this is one of the most perfectly symmetrical seashells in the world. It is found near the coasts of the Americas.

Dark and light brown stripes along the whorls

ANSWERS: 1. Venus comb murex 2. Flat periwinkle 3. Violet spider conch shell 4. Triumphant star turban 5. Pearl oyster 6. Textile cone 7. Common northern whelk shell 8. West Indian worm shell 9. Trapezium horse conch 10. Atlantic sea scallop 11. Atlantic triton 12. Scotch bonnet 13. Banded wedge shell 14. Fly-spotted auger shell 15. Sundial shell



① This deep-ocean creature is the biggest invertebrate on Earth, measuring up to 18 m (59 ft) in length and weighing almost one tonne.

The largest eyes among all animals – the size of a dinner plate – help it spot predators and see in the dark.

Its two tentacles can be up to 10 m (33 ft) in length.

Its eight arms are up to 3 m (10 ft) long each.

Molluscs on the move

While some molluscs are known for moving very slowly, others, including octopuses, squid, and cuttlefish, can move very fast. These creatures are also excellent hunters and, in some cases, masters of disguise. Along with nautiluses, they belong to a group known as cephalopods – animals with multiple limbs surrounding their mouths.

Black spots all over its body

② Living in small schools of up to 30 individuals, this invertebrate feeds on small fish and shrimps in shallow reefs. It has a torpedo-shaped body and fins that extend nearly the entire length of its body, about 20 cm (8 in) in length.

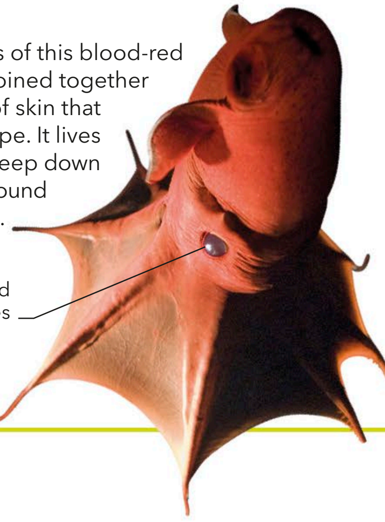
Fins act as wings when it shoots out of the water, helping it glide through the air.

③ Capable of launching itself out of the water, this creature can "fly" 30 m (98 ft) across the surface of the sea to escape predators.

Distinctive red colour

④ The largest octopus in the world, this mollusc can grow up to 4.8 m (16 ft) long. It is found in the North Pacific Ocean, using its long arms to crawl along the seabed looking for crabs, lobsters, and shrimps to eat.

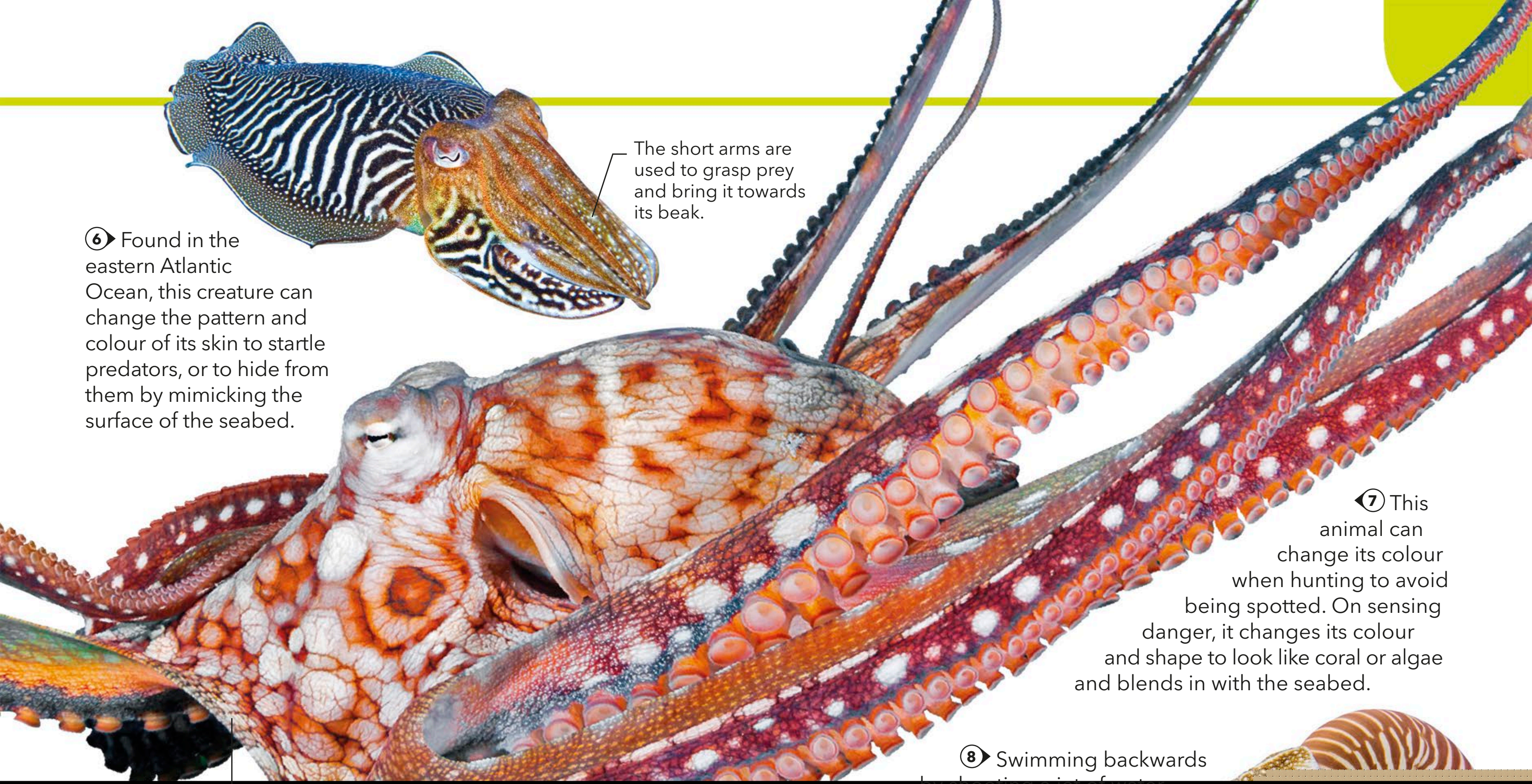
Each of its long arms is equipped with more than 250 suckers to give it a secure grip on prey.



⑤ The legs of this blood-red mollusc are joined together by a web of skin that resembles a cape. It lives in dark areas deep down in oceans around the world.

Blood-red eyes

ANSWERS: 1. Giant squid 2. Caribbean reef squid 3. Japanese flying squid 4. Giant Pacific octopus 5. Vampire squid 6. Common cuttlefish 7. Day octopus 8. Palau nautilus 9. Dumbo octopus 10. Flamboyant cuttlefish 11. Caribbean reef octopus



The short arms are used to grasp prey and bring it towards its beak.

⑥ Found in the eastern Atlantic Ocean, this creature can change the pattern and colour of its skin to startle predators, or to hide from them by mimicking the surface of the seabed.

⑦ This animal can change its colour when hunting to avoid being spotted. On sensing danger, it changes its colour and shape to look like coral or algae and blends in with the seabed.

⑧ Swimming backwards by shooting a jet of water out of its body, this shell dweller moves to shallow water at night to feed on crabs, fish, and shrimps. It catches them using its short, noodle-like tentacles.

The webbing connecting its arms is packed with colour-changing cells.

⑨ Found 4,000 m (13,100 ft) below the ocean surface, this is the deepest-living octopus so far discovered. Its short arms enable it to crawl on the seabed looking for prey.

⑩ The vibrant colours and patterns on this Indo-Pacific creature's skin warn predators that it is toxic. An active predator, it hunts fish and crabs in the daytime.

Brown blotches provide camouflage among coral reefs.

Its arms are used to walk along the seabed.

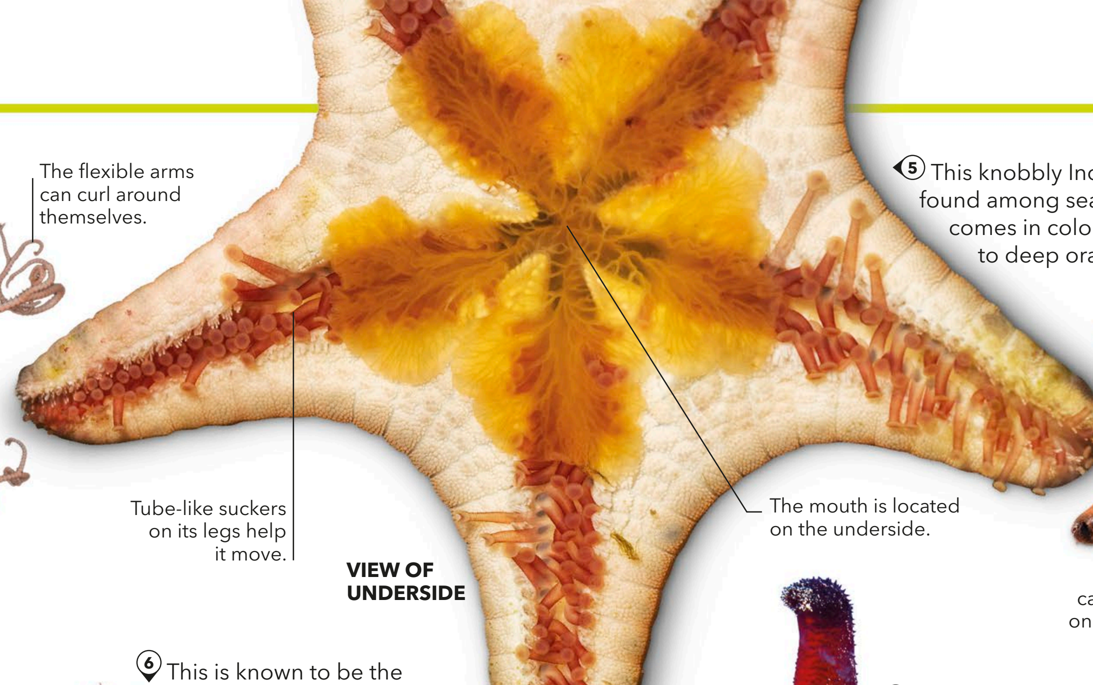
Fins resemble the ears of an elephant.

⑪ Spreading its web-like, suckered arms to catch prey, this tropical reef invertebrate uses its toothed tongue to feed on crabs, lobsters, and even members of its own species.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Vampire squid	**Caribbean reef octopus**	**Common cuttlefish**
Giant squid	**Dumbo octopus**	**Flamboyant cuttlefish**
Giant Pacific octopus	**Caribbean reef squid**	**Palau nautilus**
Japanese flying squid	**Day octopus**	

The flexible arms can curl around themselves.

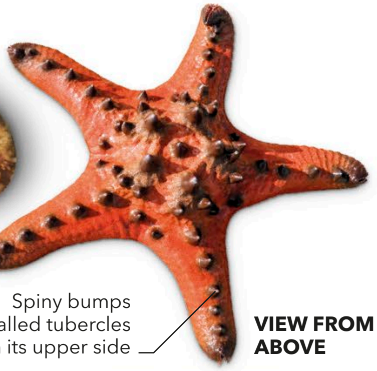


Tube-like suckers on its legs help it move.

The mouth is located on the underside.

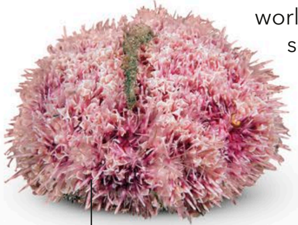
VIEW OF UNDERSIDE

⑤ This knobbly Indo-Pacific species is mostly found among seaweed in shallow waters. It comes in colours ranging from light brown to deep orange.



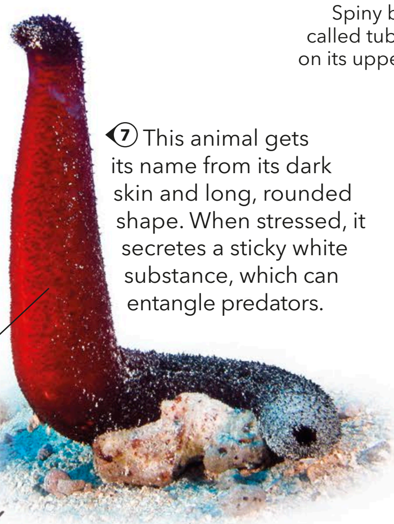
Spiny bumps called tubercles on its upper side

VIEW FROM ABOVE



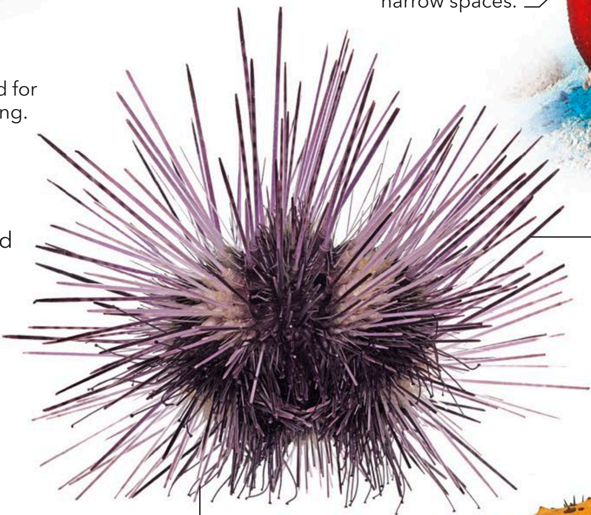
⑥ This is known to be the world's most venomous sea urchin. Its spines sting anything that may touch it, and the animal has few natural predators.

Petal-like growths extend out of the spines and are used for feeding and cleaning.



⑦ This animal gets its name from its dark skin and long, rounded shape. When stressed, it secretes a sticky white substance, which can entangle predators.

Smooth, soft skin helps it slide through narrow spaces.

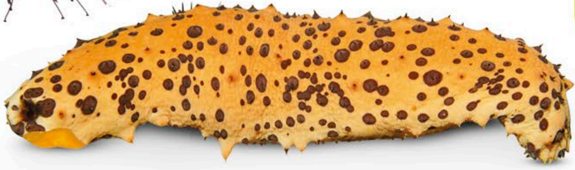


⑧ Hiding in dark crevices in the seabed by day, this creature emerges at night to feed on coral and algae. If threatened, it bristles its long spines.

Hard-tipped spines are venomous.

Tube-like feet for moving across the seabed

⑨ This animal gets its name from its golden brown body that is covered with dark brown blotches. It feeds on small particles off the seafloor.



TEST YOURSELF

STARTER

- Crown-of-thorns starfish
- Horned sea star
- Chocolate chip cucumber
- Long-spined sea urchin

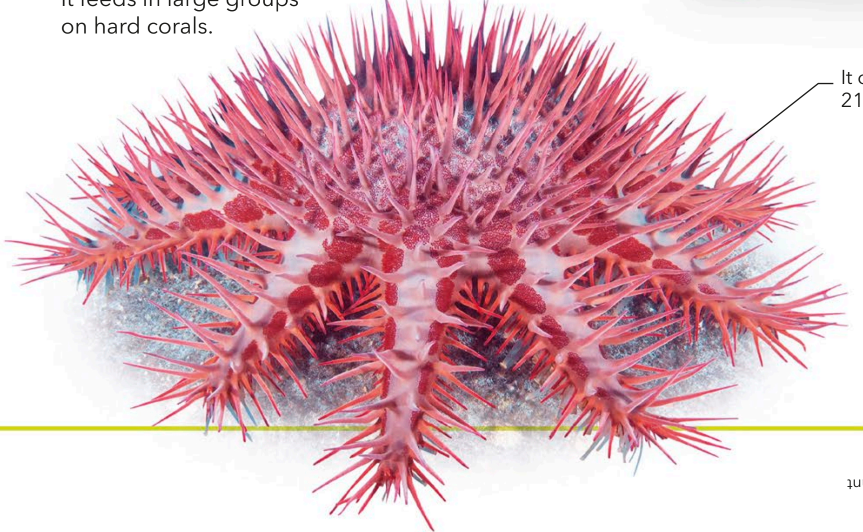
CHALLENGER

- **Flower urchin**
- **Black sea cucumber**
- **Sea apple cucumber**
- **Granulated sea star**

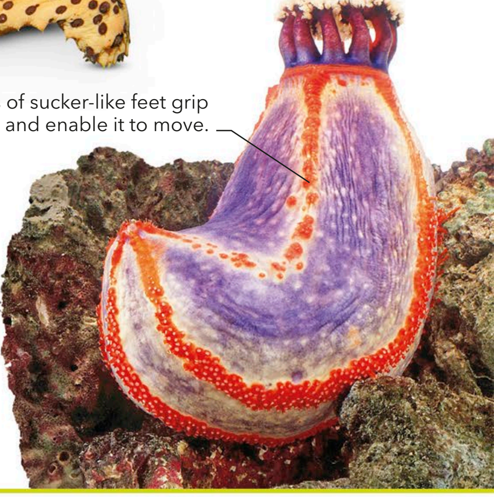
GENIUS!

- **Common basket star**
- **Elegant feather star**
- **Reticulated sea biscuit**

⑩ Easily recognizable by the spikes covering its body, this creature is found on reefs in the Indian and Pacific Oceans. It feeds in large groups on hard corals.



It can have up to 21 spiny arms.



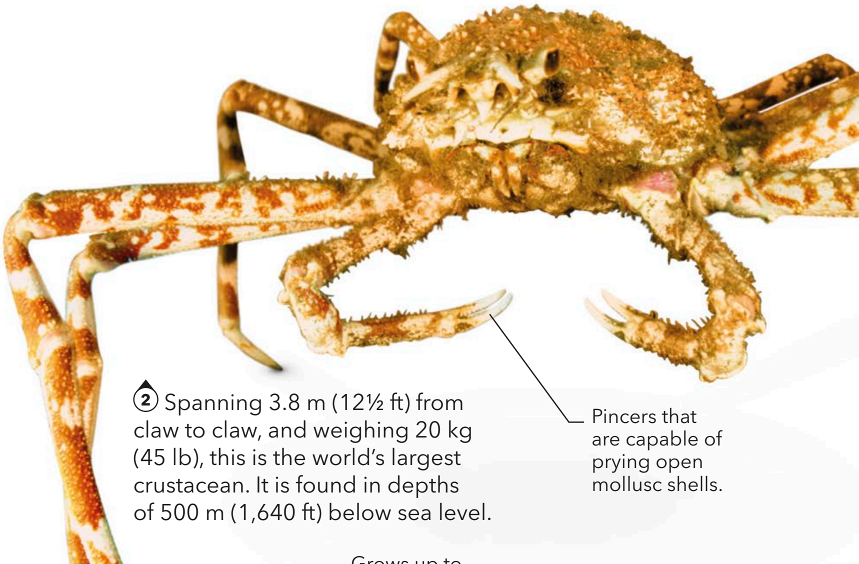
Five rows of sucker-like feet grip the rock and enable it to move.

⑪ This creature may grow up to 20 cm (8 in) long, but can swell to almost double its size by swallowing water when threatened.

ANSWERS: 1. Reticulated sea biscuit 2. Granulated sea star 3. Common basket star 4. Elegant feather star 5. Horned sea star 6. Flower urchin 7. Black sea cucumber 8. Long-spined sea urchin 9. Chocolate chip cucumber 10. Crown-of-thorns starfish 11. Sea apple cucumber

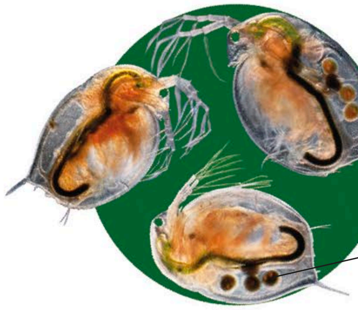
Armoured animals

There are 40,000 species of crustaceans – animals with hard shells and jointed legs – on Earth. Most live underwater, but a few are land dwellers and prefer dark and damp spaces. How many can you recognize?



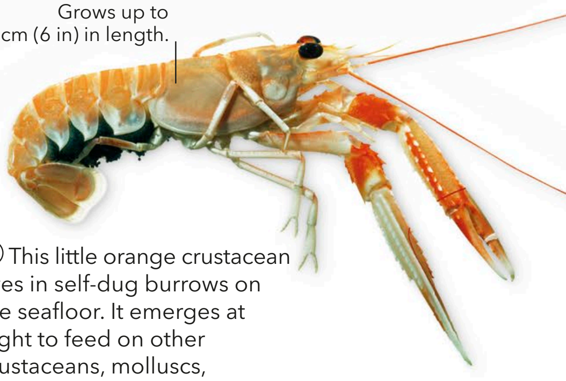
② Spanning 3.8 m (12½ ft) from claw to claw, and weighing 20 kg (45 lb), this is the world's largest crustacean. It is found in depths of 500 m (1,640 ft) below sea level.

Pincers that are capable of prying open mollusc shells.



① At just a few millimetres in length, this crustacean is one of the smallest. Its outer shell is almost transparent, so you can see its insides.

Pouch can hold up to 20 eggs.

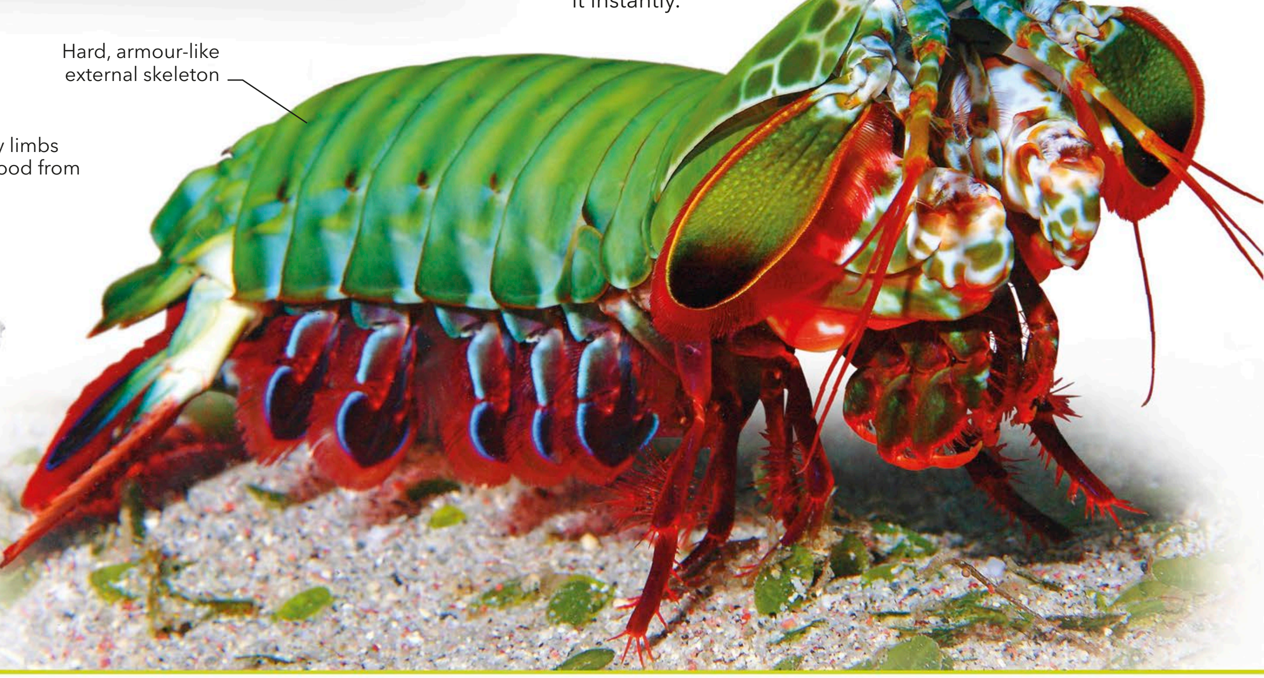


Grows up to 15 cm (6 in) in length.

④ This little orange crustacean lives in self-dug burrows on the seafloor. It emerges at night to feed on other crustaceans, molluscs, worms, and starfish.

③ This stripy crustacean feeds on worms and other debris on the seafloor. It can produce as many as 800,000 eggs in a single spawning.

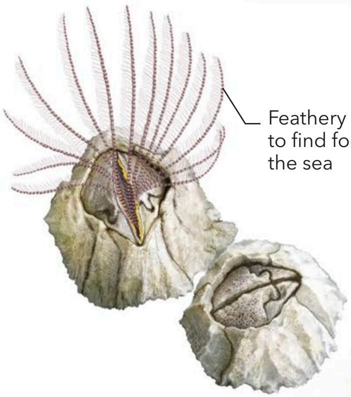
Long antennae allow it to sense its surroundings.



⑤ This creature's club-like claws pack a powerful punch at 80 km/h (50 mph) – the fastest of any animal. It can smash its way through the shell of a crab, killing it instantly.

Eyes rotate independently to detect the prey's exact range for an accurate strike.

Hard, armour-like external skeleton



Feathery limbs to find food from the sea

⑥ Found stuck to rocks and boats, this relative of the shrimp grows a chalky shell to protect the soft body inside.

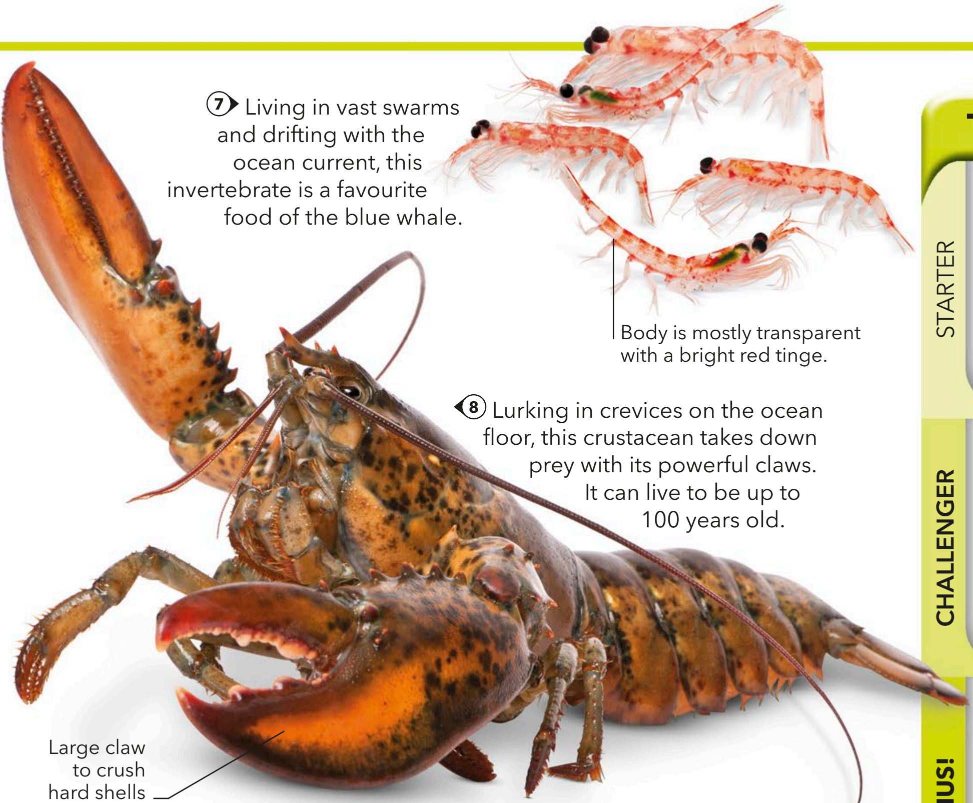
ANSWERS: 1. Common water flea 2. Japanese spider crab 3. Giant tiger prawn 4. Langoustine 5. Peacock mantis shrimp 6. Acorn barnacle 7. Antarctic krill 8. American lobster 9. Blue crayfish 10. Christmas Island red crab 11. Atlantic ghost crab 12. Common woodlouse

Mottled orange and white shell gives it camouflage.

Spider-like legs to walk across the ocean floor.

⑦ Living in vast swarms and drifting with the ocean current, this invertebrate is a favourite food of the blue whale.

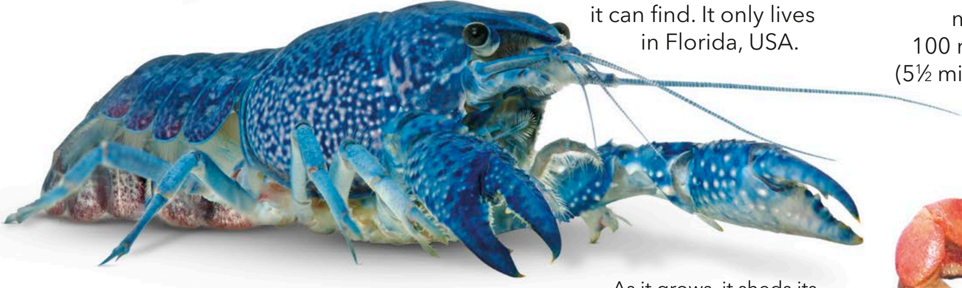
Body is mostly transparent with a bright red tinge.



⑧ Lurking in crevices on the ocean floor, this crustacean takes down prey with its powerful claws. It can live to be up to 100 years old.

Large claw to crush hard shells

⑨ This freshwater crustacean will eat any animal or plant matter it can find. It only lives in Florida, USA.



⑩ These crustaceans are native to an island in the Indian Ocean. Famous for their annual mass migration, every year up to 100 million of them crawl 9 km (5½ miles) to the beach to breed.

As it grows, it sheds its shell to reveal a new, soft one below that hardens over a few days.

⑪ Scuttling across the sand, this creature blends in so well it seems to disappear. It can run at a speed of 15 km/h (9¼ mph).

White pincers to snatch up prey

It rolls into a ball when disturbed.

⑫ Thriving in damp, dark environments, this crustacean feeds on dead plants and rotting animals. It can be found under wet logs.

TEST YOURSELF

STARTER

- American lobster
- Giant tiger prawn
- Blue crayfish
- Japanese spider crab

CHALLENGER

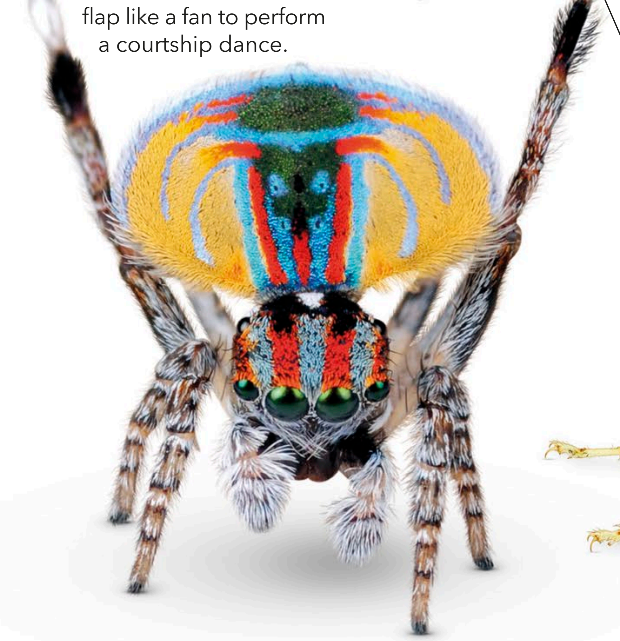
- **Antarctic krill**
- **Christmas Island red crab**
- **Peacock mantis shrimp**
- **Common woodlouse**

GENIUS!

- **Atlantic ghost crab**
- **Acorn barnacle**
- **Common water flea**
- **Langoustine**

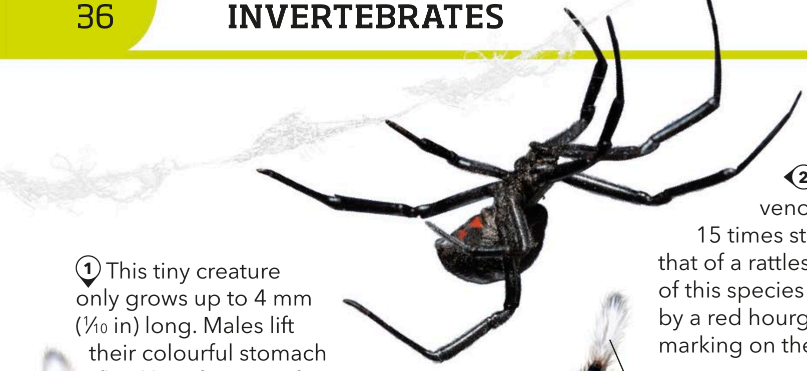
Arachnids

Specialized predators that can sting, bite, or rip apart their prey, arachnids have eight legs, two main body parts, and up to eight eyes. A few trap their prey by spinning large webs of silk, while others grab and crush theirs using strong claws.

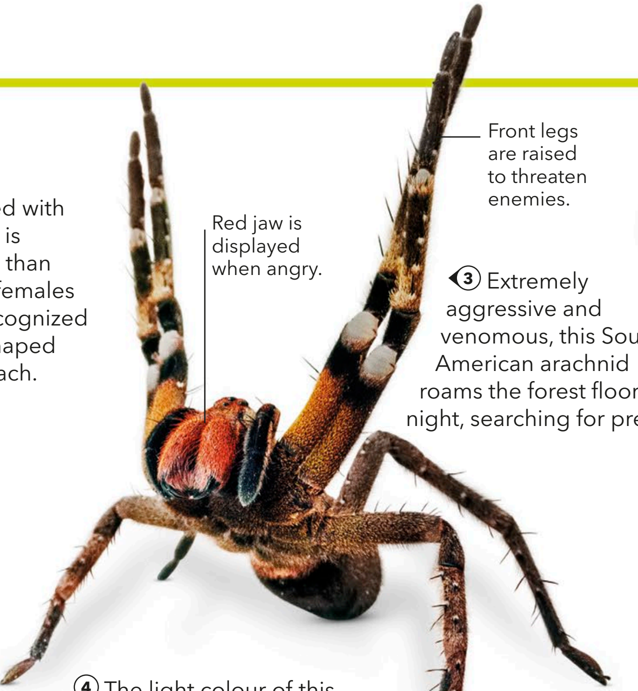


① This tiny creature only grows up to 4 mm (1/10 in) long. Males lift their colourful stomach flap like a fan to perform a courtship dance.

White-tipped, tufted legs



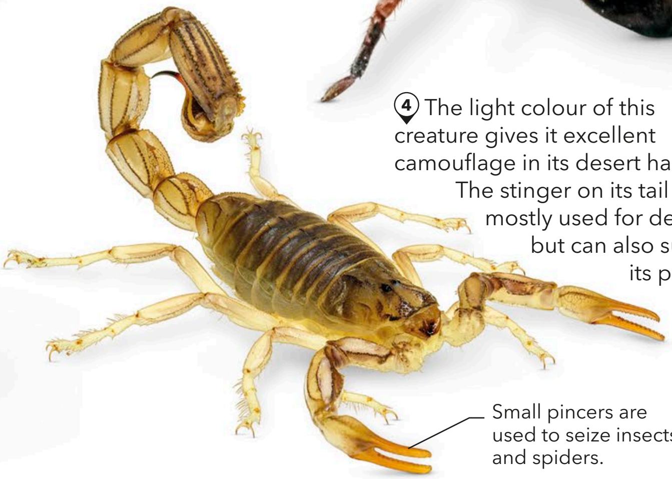
② Armed with venom that is 15 times stronger than that of a rattlesnake, females of this species are recognized by a red hourglass-shaped marking on the stomach.



Red jaw is displayed when angry.

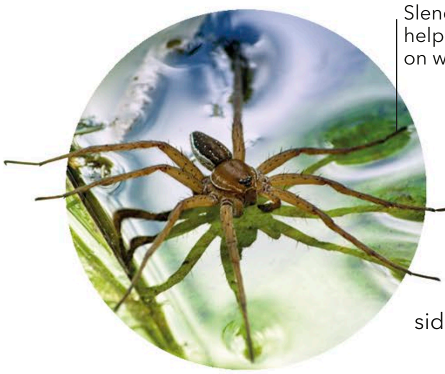
Front legs are raised to threaten enemies.

③ Extremely aggressive and venomous, this South American arachnid roams the forest floor at night, searching for prey.



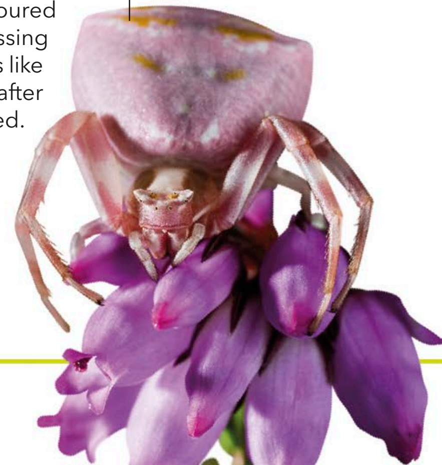
④ The light colour of this creature gives it excellent camouflage in its desert habitat. The stinger on its tail is mostly used for defence, but can also subdue its prey.

Small pincers are used to seize insects and spiders.



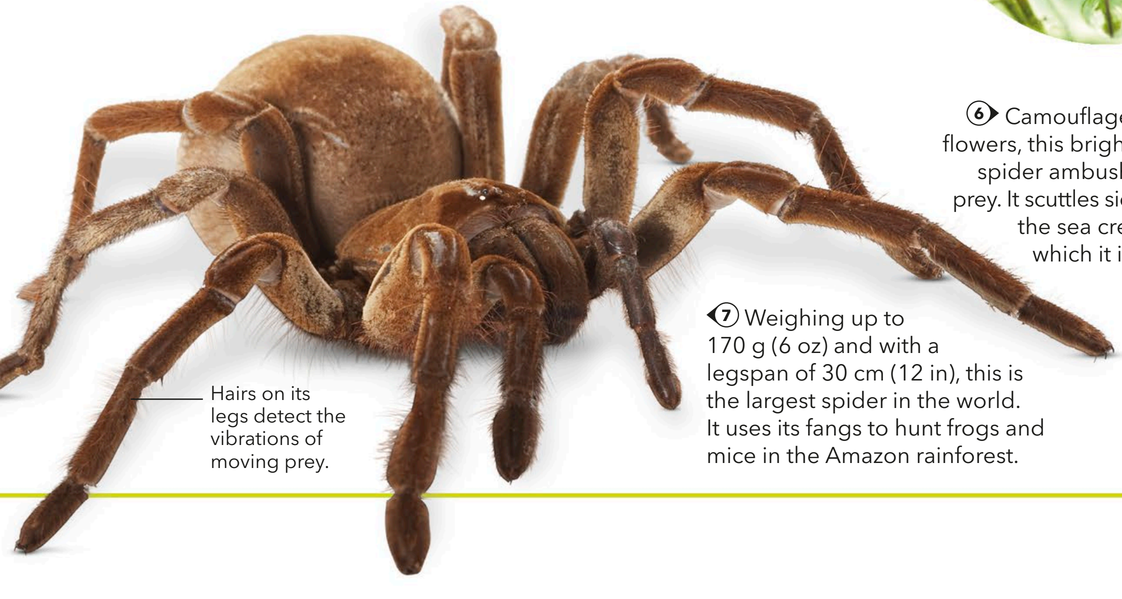
Slender legs help it walk on water.

⑤ Hunting on the edges of ponds and bogs, this European spider catches and feasts on fish. A white stripe runs along the side of its abdomen.



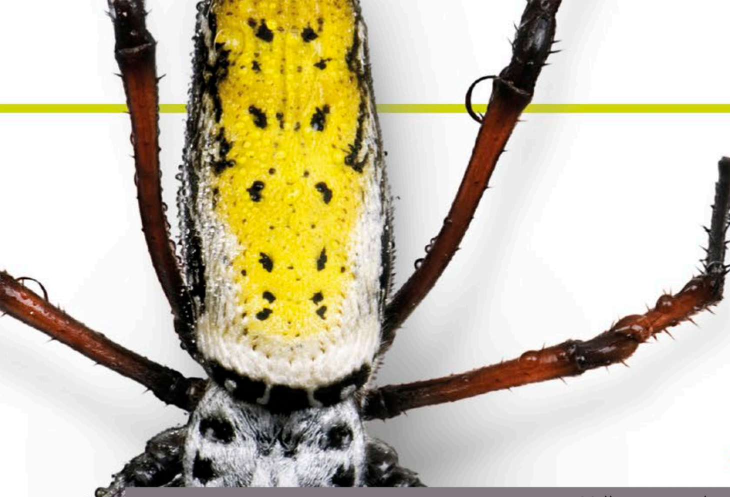
⑥ Camouflaged perfectly on flowers, this brightly coloured spider ambushes passing prey. It scuttles sideways like the sea creature after which it is named.

Its body can change colour to match the flower it sits on.

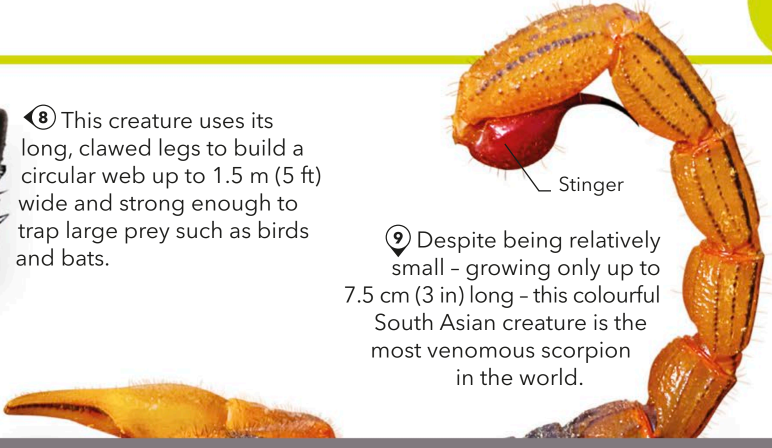


⑦ Weighing up to 170 g (6 oz) and with a legspan of 30 cm (12 in), this is the largest spider in the world. It uses its fangs to hunt frogs and mice in the Amazon rainforest.

Hairs on its legs detect the vibrations of moving prey.



⑧ This creature uses its long, clawed legs to build a circular web up to 1.5 m (5 ft) wide and strong enough to trap large prey such as birds and bats.



⑨ Despite being relatively small – growing only up to 7.5 cm (3 in) long – this colourful South Asian creature is the most venomous scorpion in the world.

Yellow-tipped walking legs

When attacked, it can detach a leg, which continues to twitch, confusing its predator.

⑩ Feeding on the blood of mammals, including humans, this creature lives in humid regions across the world. It has a hard, flattened body and can be a carrier of diseases.

Black and red stripes on its legs

⑪ Just 9 mm (⅓ in) long, this small arachnid has no venom but defends itself by secreting a foul-smelling liquid. Unable to spin a web, it catches ants using its hooked legs.

Its thin, tail is also used as a sensory organ when it hunts at night.

⑫ This American arachnid uses its long front legs to find prey in the dark, and its pincer-like claws to snatch and kill it. It sprays an acidic liquid from the base of its tail to deter predators.

TEST YOURSELF

STARTER

Indian red scorpion
Red-legged golden orb-weaver spider
Pink crab spider
Yellow fat-tailed scorpion

CHALLENGER

Castor bean tick
Giant whip scorpion
Southern black widow
Goliath birdeater
Chinese hourglass spider

GENIUS!

Harvestman
Giant raft spider
Brazilian wandering spider
Peacock spider

⑬ This rare Asian creature lives in an underground burrow. It builds a system of silk tripwires around the burrow to detect passing prey.

Thick, short legs help it drag insects into its burrow.

A hardened disc on its abdomen is used to block its burrow and keep predators out.

ANSWERS: 1. Peacock spider 2. Southern black widow 3. Brazilian wandering spider 4. Yellow fat-tailed scorpion 5. Giant raft spider 6. Pink crab spider 7. Goliath birdeater 8. Red-legged golden orb-weaver spider 9. Indian red scorpion 10. Castor bean tick 11. Harvestman 12. Giant whip scorpion 13. Chinese hourglass spider

Crickets and grasshoppers
These insects produce unique chirping sounds by rubbing their body parts together.

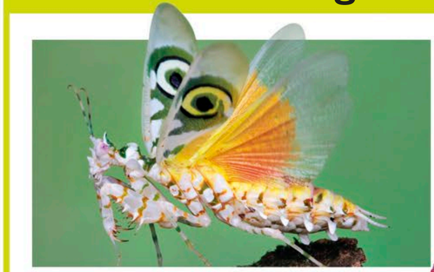
Wasps, ants, and bees
The members of this group have narrow "waists" and many live in colonies.

Flies
Found almost everywhere on Earth, these insects are an important source of food for birds, fish, and mammals.

I don't believe it!

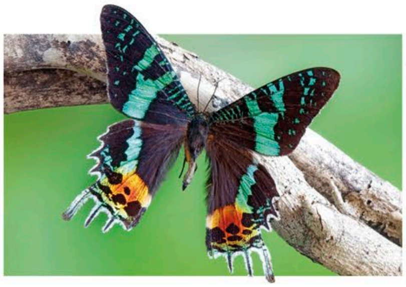
Dragonflies have compound eyes made up of up to 30,000 tiny detectors that can sense small changes in brightness and colour in their environment.

Wonderful wings



Hidden predator: The spiny flower mantis uses its colourful wings to mimic a flower and lure in its prey.

Expert flier: The wings of dragonflies, like this red marsh glider, help them fly up, down, and from side to side.



Iridescent wings: The Madagascan sunset moth's wings are covered in tiny scales, which shimmer with rainbow colours.

Bright defences: The checkered beetle has brightly patterned wing cases that may warn predators to stay away.

Heavy lifting

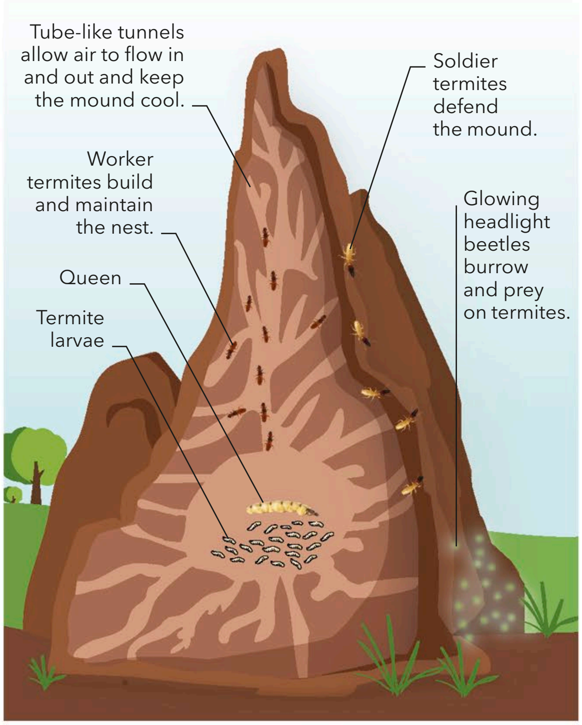
Weighing a whopping 50 g ($1\frac{3}{4}$ oz) – about as much as a golf ball – the goliath beetle is one of the largest insects in the world. It can lift objects 850 times its own weight!

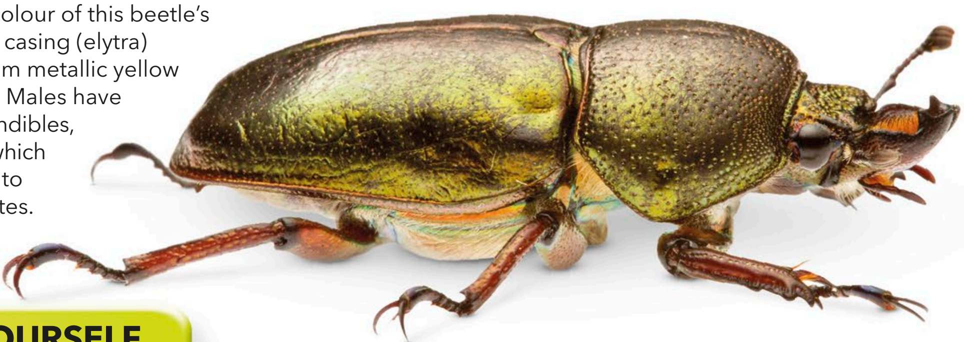
Incredible insects

- The desert locust is one of the most destructive insects on the planet. In only a few hours, a swarm of 40–80 million insects, packed in 1 sq km ($\frac{1}{3}$ sq mile), can eat enough grain to feed 35,000 people for a day.
- The shrill thorntree cicada is the loudest insect in the world. It can produce a sound that measures 106 decibels – that is as loud as a chainsaw!
- Fleas are expert leapers, and can jump up to 150 times their own height in a single bound!

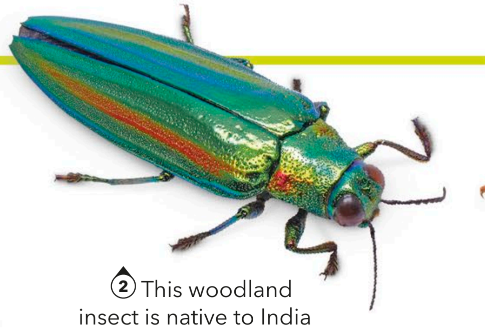
Colossal colonies

Termites live together in large groups, or colonies, of up to one million individuals. They are master builders and can construct mud mounds over 10 m (33 ft) tall – more than five times the height of an adult human.


Tube-like tunnels allow air to flow in and out and keep the mound cool.
Soldier termites defend the mound.
Worker termites build and maintain the nest.
Glowing headlight beetles burrow and prey on termites.
Queen
Termite larvae



① The colour of this beetle's forewing casing (elytra) varies from metallic yellow to green. Males have large mandibles, or jaws, which are used to court mates.



② This woodland insect is native to India and Southeast Asia. Despite its bright, gem-like colours, it can hide in plain sight from predators because its shiny wing casing reflects sunlight.

TEST YOURSELF

STARTER

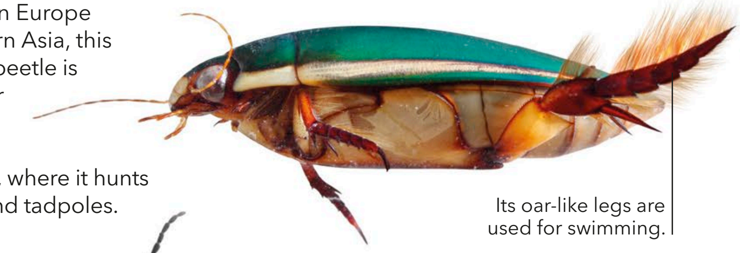
- Seven-spot ladybird
- Golden stag beetle
- Flightless dung beetle
- Red-striped oil beetle

CHALLENGER

- **Sabertooth longhorn beetle**
- **Great diving beetle**
- **Giraffe-necked weevil**
- **Scarlet lily beetle**
- **Tiger beetle**

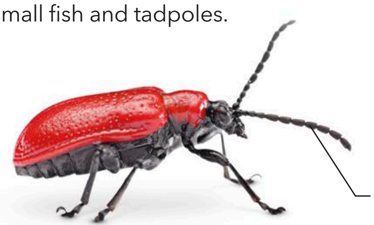
GENIUS!

- **Longhorn beetle**
- **Caucasus beetle**
- **Golden ground beetle**
- **Asian bombardier beetle**
- **Jewel beetle**



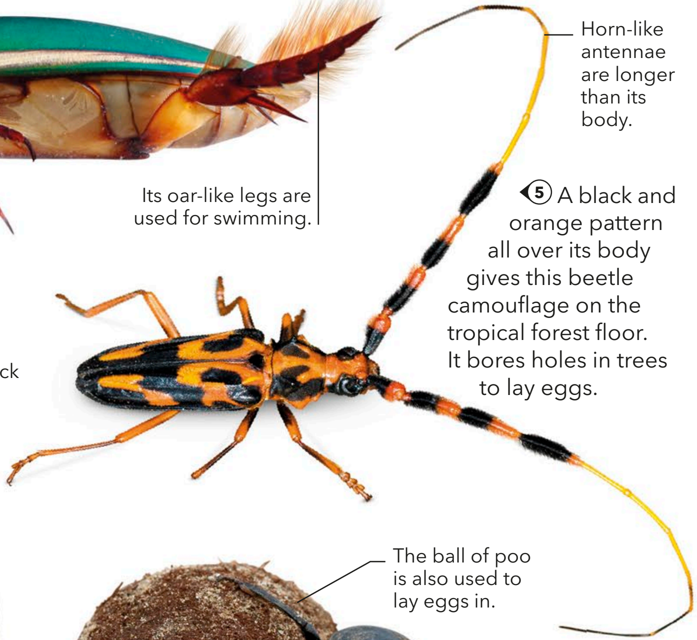
③ Found in Europe and northern Asia, this freshwater beetle is named after its ability to swim underwater, where it hunts small fish and tadpoles.

Its oar-like legs are used for swimming.



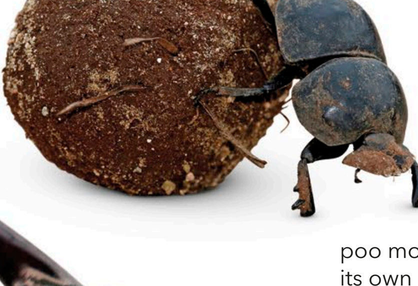
Long, black antennae

④ Known for devouring one particular flowering plant, this bright red beetle squeaks to ward off predators.



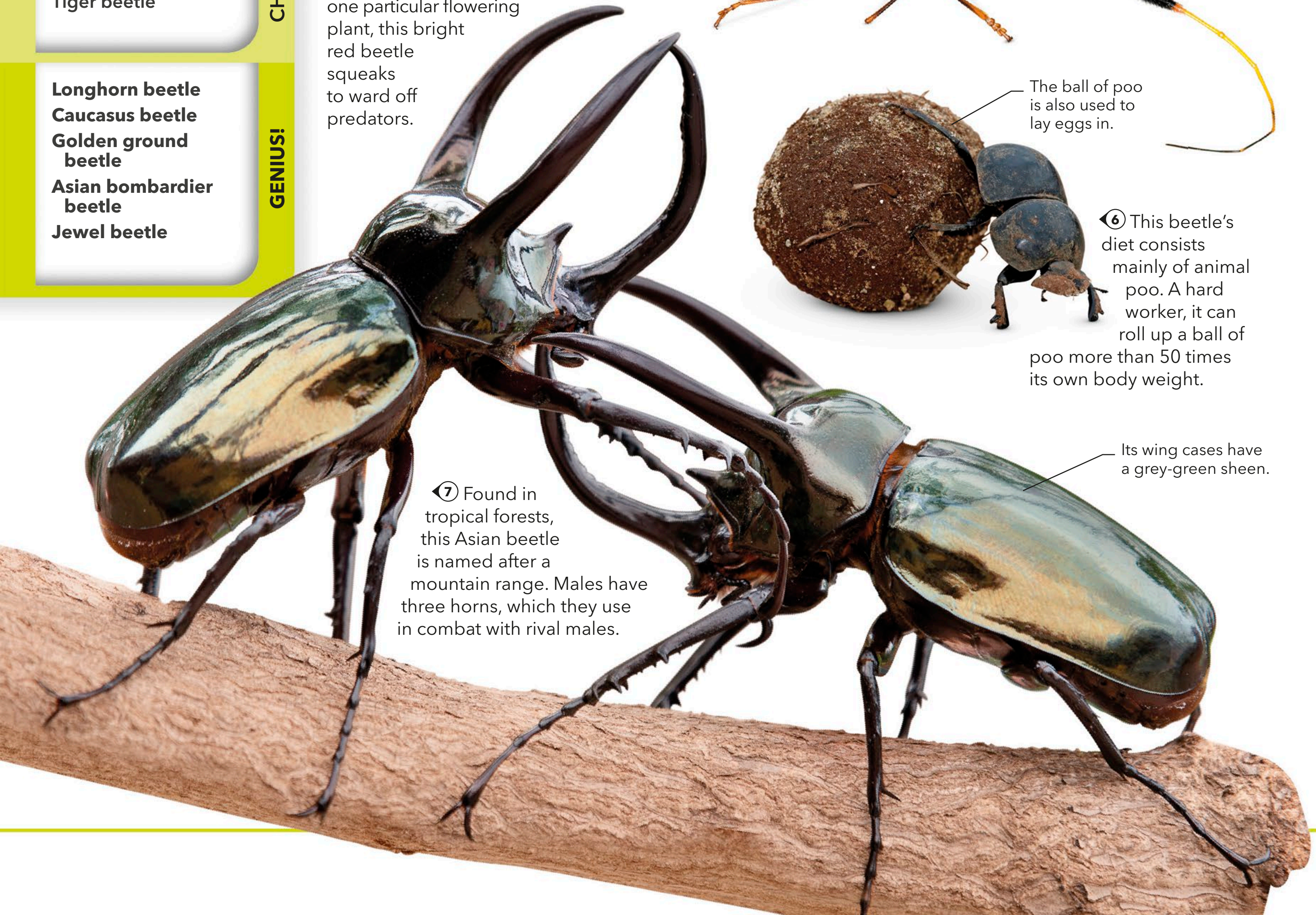
Horn-like antennae are longer than its body.

⑤ A black and orange pattern all over its body gives this beetle camouflage on the tropical forest floor. It bores holes in trees to lay eggs.



The ball of poo is also used to lay eggs in.

⑥ This beetle's diet consists mainly of animal poo. A hard worker, it can roll up a ball of poo more than 50 times its own body weight.



⑦ Found in tropical forests, this Asian beetle is named after a mountain range. Males have three horns, which they use in combat with rival males.

Its wing cases have a grey-green sheen.

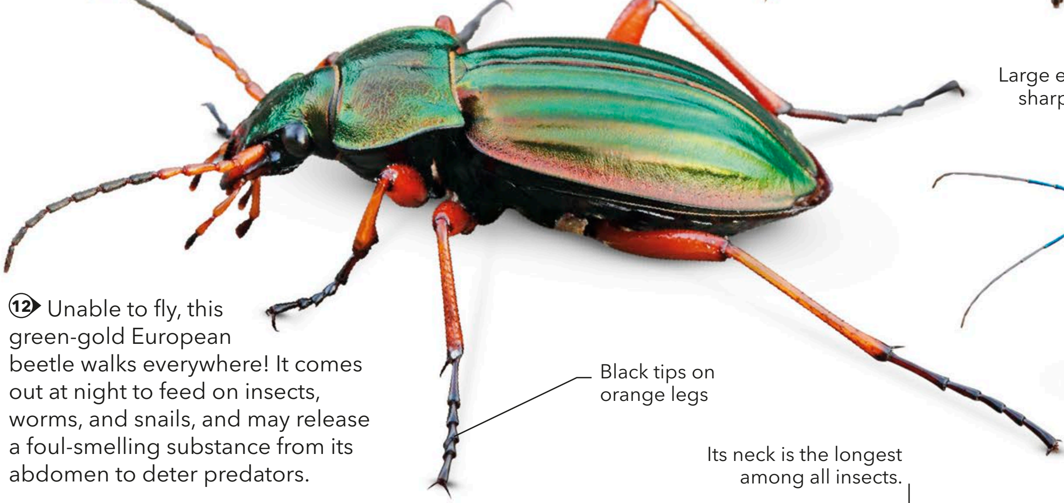
Large mandibles are used to fight rival males.

⑧ One of the largest beetles in the world, this insect can grow up to 17 cm (6½ in) long. It is named for its enormous mandibles (mouthparts), which are prominent only in males.

⑨ This grassland beetle eats aphids, also known as greenfly, which infest plants to drink their sap. It can eat up to 75 aphids a day, making it a favourite of farmers and gardeners.

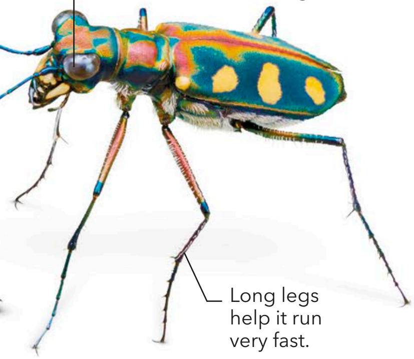
Spotted wing cases warn predators that it tastes bad.

⑩ Found mostly in woodlands and grasslands, this beetle sprays a combination of toxic, burning chemicals from its rear end to protect itself against predators.



⑫ Unable to fly, this green-gold European beetle walks everywhere! It comes out at night to feed on insects, worms, and snails, and may release a foul-smelling substance from its abdomen to deter predators.

Black tips on orange legs



⑪ With a top speed of 9 km/h (5½ mph), this is the fastest-known beetle. It hunts its prey and slices through it with its powerful jaws, much like a well-known big cat.

Large eyes for sharp vision

Long legs help it run very fast.

Its neck is the longest among all insects.

⑬ Males of this species have long necks that give this creature its name. Females have shorter necks, which they use to roll leaves into tubes in which they lay a single egg.

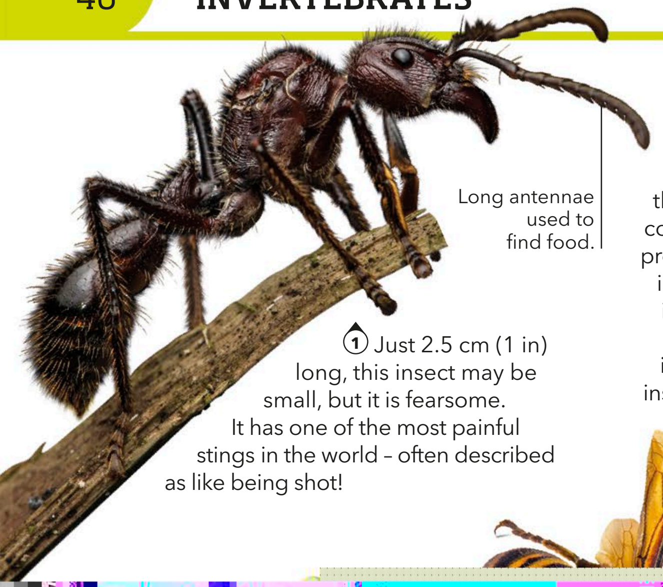
Beetle mania

There are more than 300,000 species of beetle in the world. Most have two sets of wings, but only one of these is used for flying. The second pair, known as elytra, forms a hard case that protects the flying wings. These hardy creatures can survive in most habitats, from rainforests to deserts.

Bright red abdomen

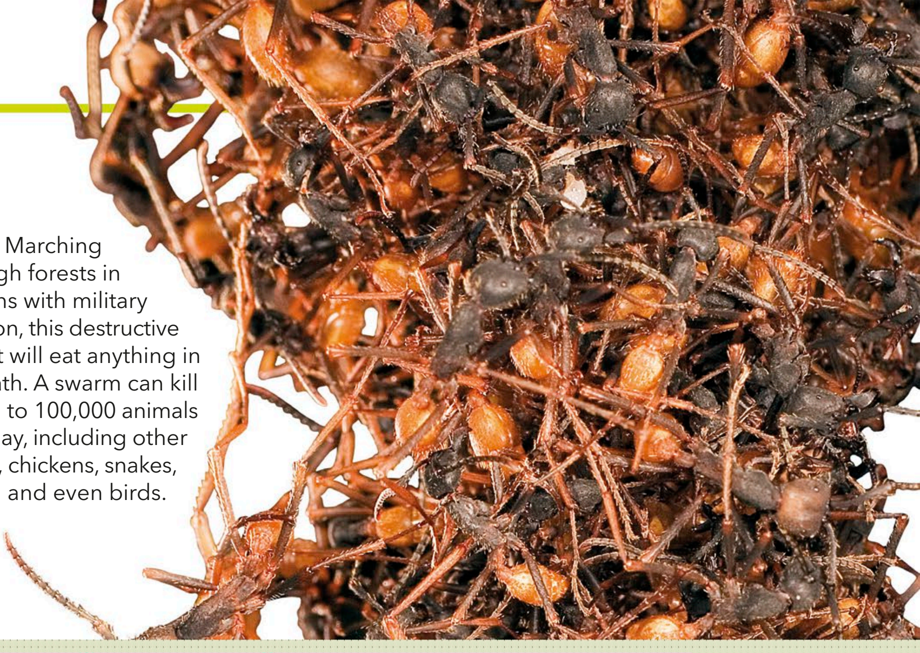
⑭ When disturbed, this insect can release an oily, toxic substance from its joints that can cause blisters if touched.

ANSWERS: 1. Golden stag beetle 2. Jewel beetle 3. Great diving beetle 4. Scarlet lily beetle 5. Longhorn beetle 6. Flightless dung beetle 7. Caucasus beetle 8. Sabertooth longhorn beetle 9. Seven-spot ladybird 10. Asian bombardier beetle 11. Tiger beetle 12. Golden ground beetle 13. Giraffe-necked weevil 14. Red-striped oil beetle



Long antennae used to find food.

① Just 2.5 cm (1 in) long, this insect may be small, but it is fearsome. It has one of the most painful stings in the world – often described as like being shot!



② Marching through forests in columns with military precision, this destructive insect will eat anything in its path. A swarm can kill up to 100,000 animals in a day, including other insects, chickens, snakes, and even birds.

③ The queens of this species from Asia can reach up to 5 cm (2 in) in length, making it one of the largest wasps in the world. It likes to hunt and kill honeybees.

Winged wonders

Bees, wasps, and ants all belong to a group of insects called hymenoptera, which means "membrane wings". This group includes important pollinators that are essential to life on Earth. Buzzing across the garden, darting from flower to flower, bees and wasps also help humans grow fruits and vegetables.

Long, segmented antennae are used to communicate with each other.

A nest, called a bivouac, is made of thousands of individuals.

④ This wasp defends its nest by beating its wings furiously. It is aggressive in its display and will sting only as a last resort because if it uses its stinger, it will die.

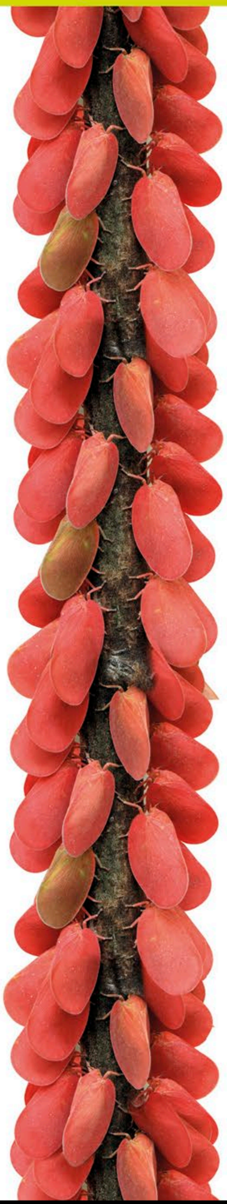
A tube-like organ is used for drilling into wood.

Sensitive antennae detect hidden prey.

Blue-black metallic sheen on the body

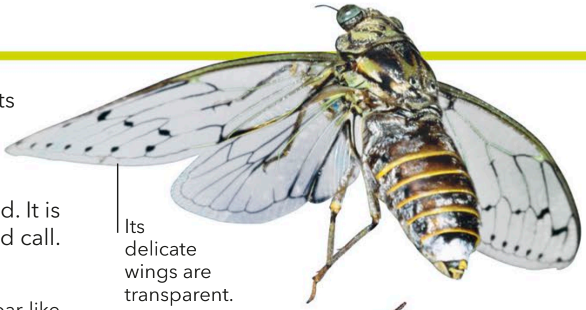
⑤ Females of this species lay a single egg inside other insects. The larva then feeds on and kills the host insect, and emerges fully grown.

ANSWERS: 1. Bullet ant 2. Army ant 3. Asian giant hornet 4. Northern warrior wasp 5. Ichneumon wasp 6. Red velvet wasp 7. Common wasp 8. Turtle ant 9. Ruby-tailed wasp 10. Western honeybee 11. Red wood ant 12. Buff-tailed bumblebee 13. Black garden ant

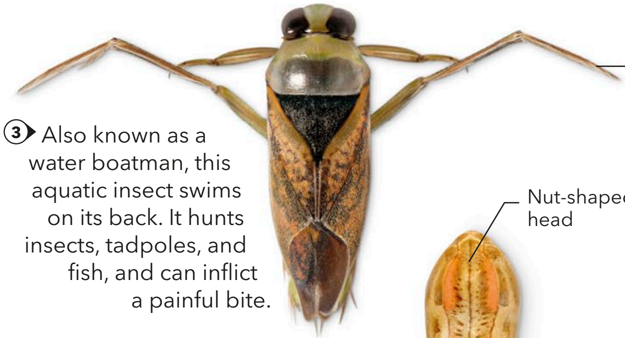


① These colourful creatures huddle together on twigs to hide from predators. When closed, their wings resemble tiny leaves.

② Spending most of its life underground as a nymph (young insect), this true bug emerges as an adult for just a short while to breed. It is known for its extremely loud call.

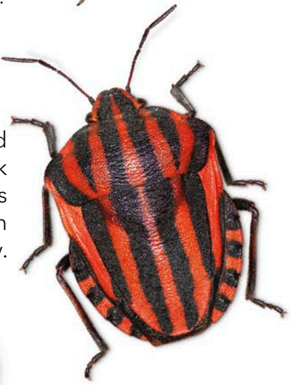


Its delicate wings are transparent.

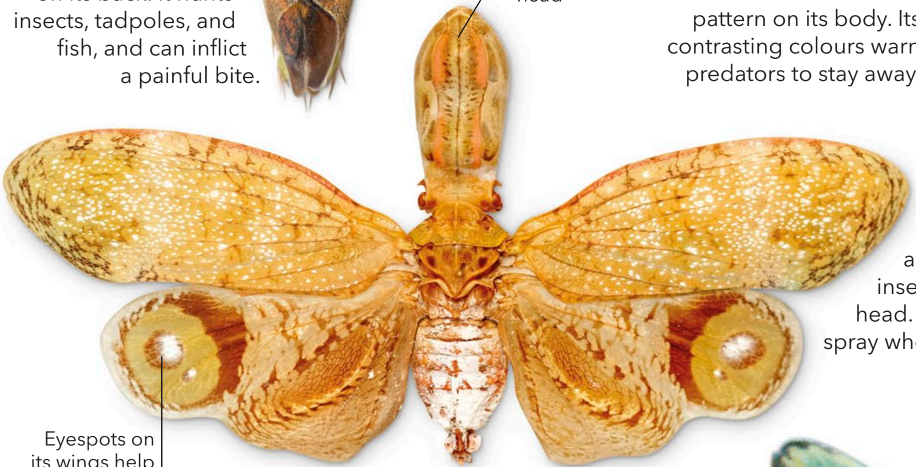


Its oar-like legs help it swim.

③ Also known as a water boatman, this aquatic insect swims on its back. It hunts insects, tadpoles, and fish, and can inflict a painful bite.



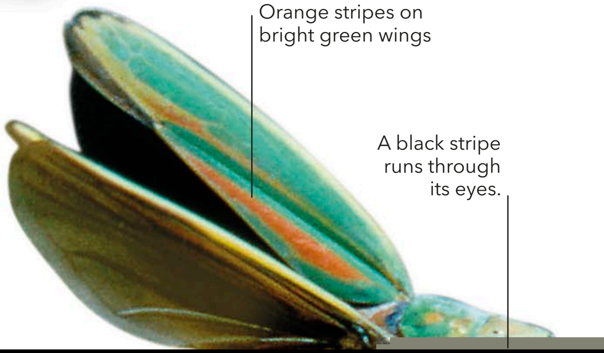
④ This bug is named for the red and black pattern on its body. Its contrasting colours warn predators to stay away.



Nut-shaped head

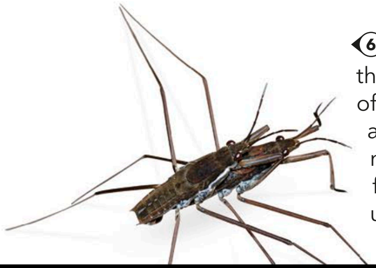
Eyespots on its wings help distract predators.

⑤ A native of Central and South America, this insect has a bulging, cylindrical head. It squirts a stinky, toxic spray when attacked.



Orange stripes on bright green wings

A black stripe runs through its eyes.



⑥ Found in lakes and ponds, this bug skates across the surface of the water. The small front legs are able to catch insects, the middle pair move the bug forwards, and the hindlegs are used to steer.

Long legs allow it to spread out its weight.

⑦ The powerful legs of this bug allow it to jump up to 60 cm (23 in) into the air. It is named after the flower on which it is most commonly found.

TEST YOURSELF

STARTER

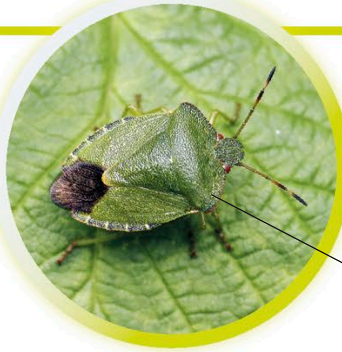
- Striped bug
- Bed bug
- Apple aphid
- Rhododendron leafhopper
- Greenhouse whitefly

CHALLENGER

- **Common water strider**
- **Common backswimmer**
- **Assassin bug**
- **Peanut bug**

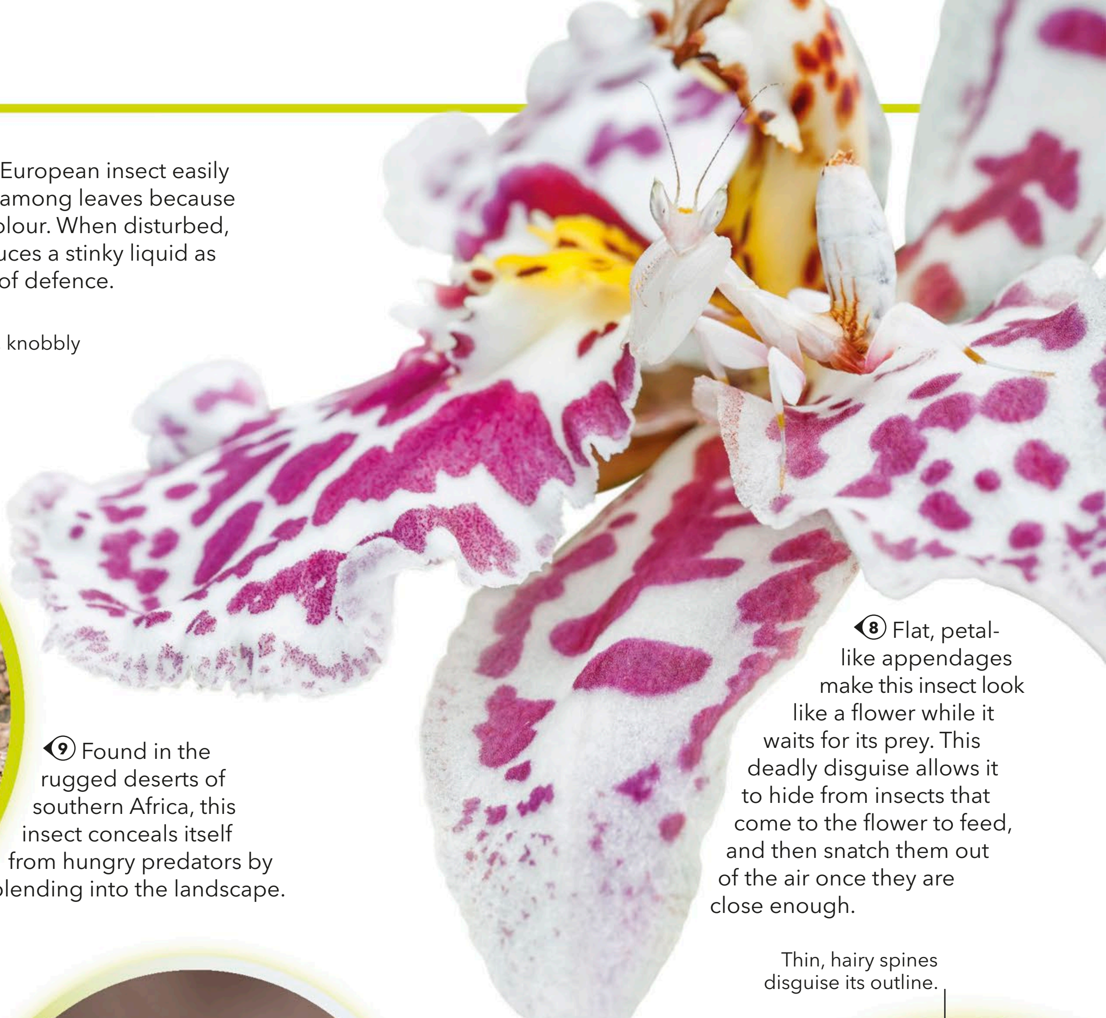
GENIUS!

- **Giant water bug**
- **Cicada**
- **Kissing bug**
- **Flatid leaf bug**

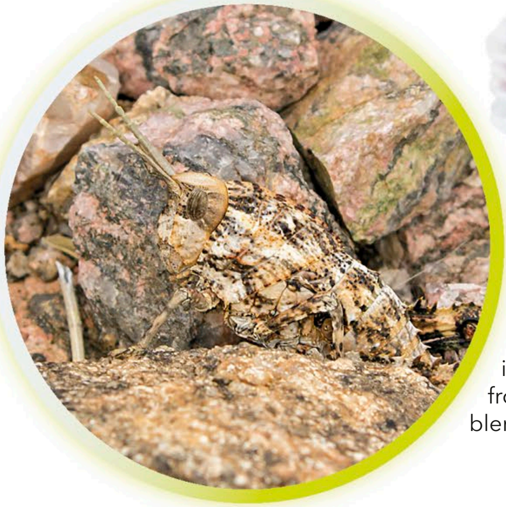


⑦ This European insect easily blends among leaves because of its colour. When disturbed, it produces a stinky liquid as a form of defence.

Broad, knobbly body

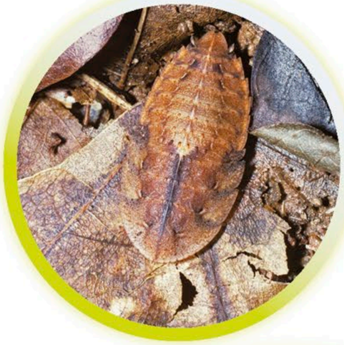


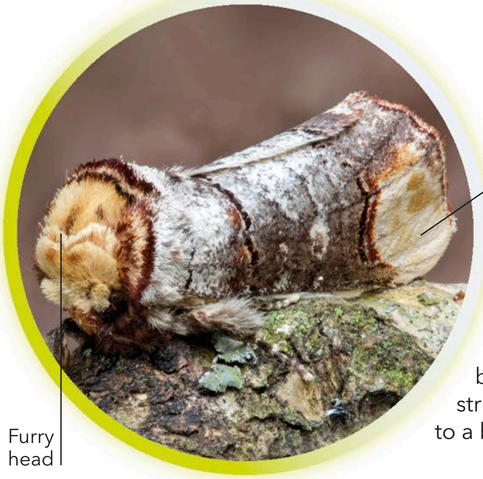
⑧ Flat, petal-like appendages make this insect look like a flower while it waits for its prey. This deadly disguise allows it to hide from insects that come to the flower to feed, and then snatch them out of the air once they are close enough.



⑨ Found in the rugged deserts of southern Africa, this insect conceals itself from hungry predators by blending into the landscape.

⑩ The flat, ridged, brown body of this hardy tropical creature helps it hide from predators by merging into the dried leaves it eats on the forest floor.

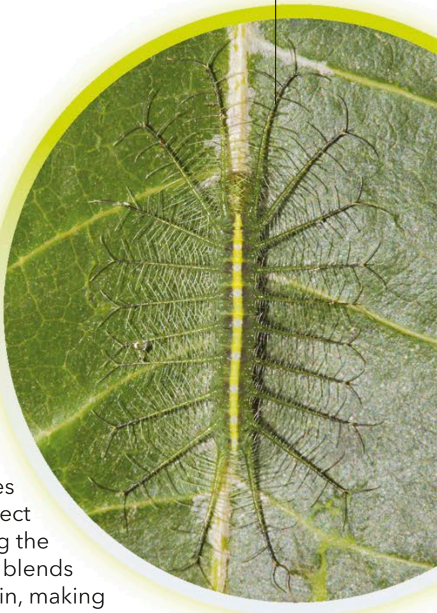




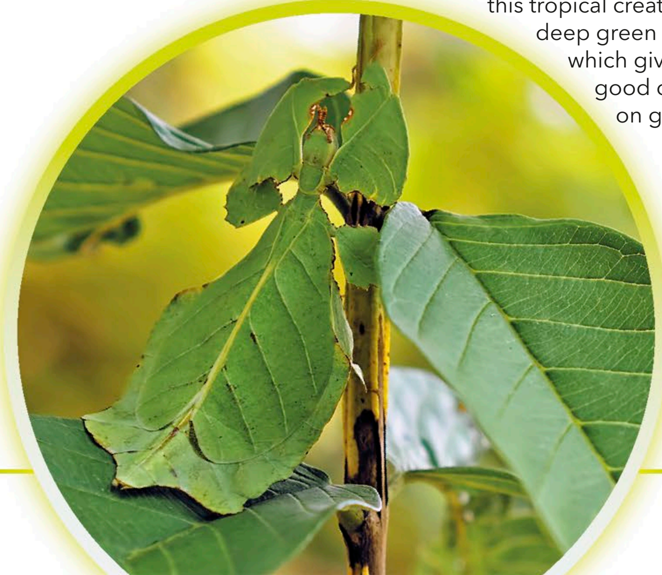
Light-coloured patch at the tip of its wings

Furry head

⑪ When at rest, the wings of this flying insect are held against its body and give it a striking resemblance to a broken birch twig.



Thin, hairy spines disguise its outline.

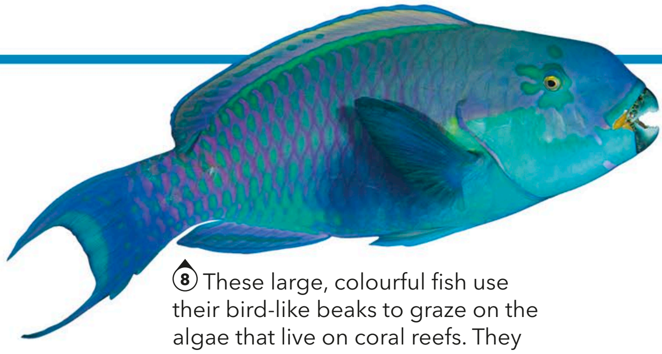


⑫ Closely related to stick insects, this tropical creature has a deep green colouring, which gives it very good camouflage on green plants.

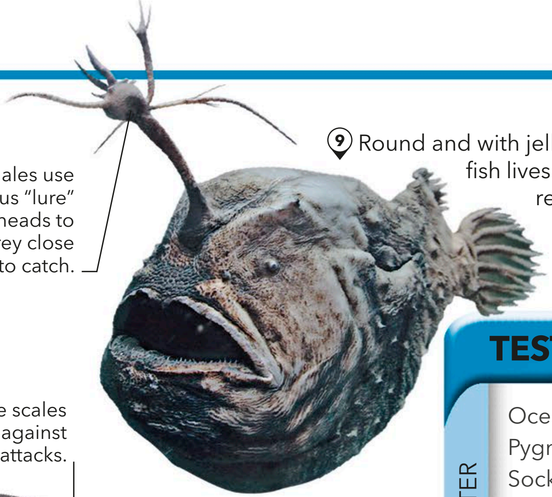
⑬ Found on the leaves of mango trees, this insect has a pale stripe along the centre of its body that blends into the leaf's central vein, making it almost entirely invisible to birds.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Madagascan stick insect	**Moss mimic bush cricket**	**Baron caterpillar**
Leaf insect	**Thorn bug**	**Buff-tip moth**
Orchid mantis	**Green shield bug**	**Katydid**
Indian leaf butterfly	**Rock locust**	**Ghost mantis**
	Caribbean wafer cockroach	

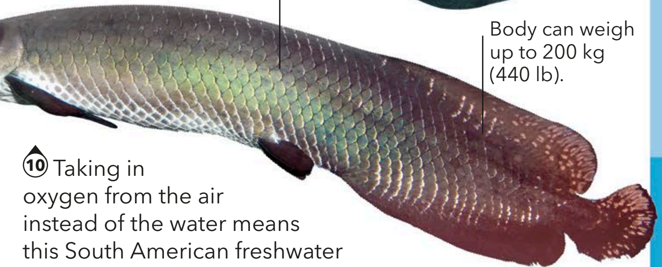


⑧ These large, colourful fish use their bird-like beaks to graze on the algae that live on coral reefs. They often swim together, in big groups of around 40 fish.



Females use a luminous "lure" on their heads to tempt prey close enough to catch.

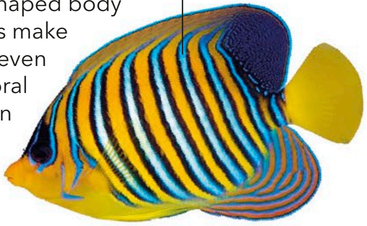
⑨ Round and with jelly-like flesh, this fish lives in the deep, dark regions of the ocean. Females are much larger than males.



Strong, flexible scales protect against piranha attacks.

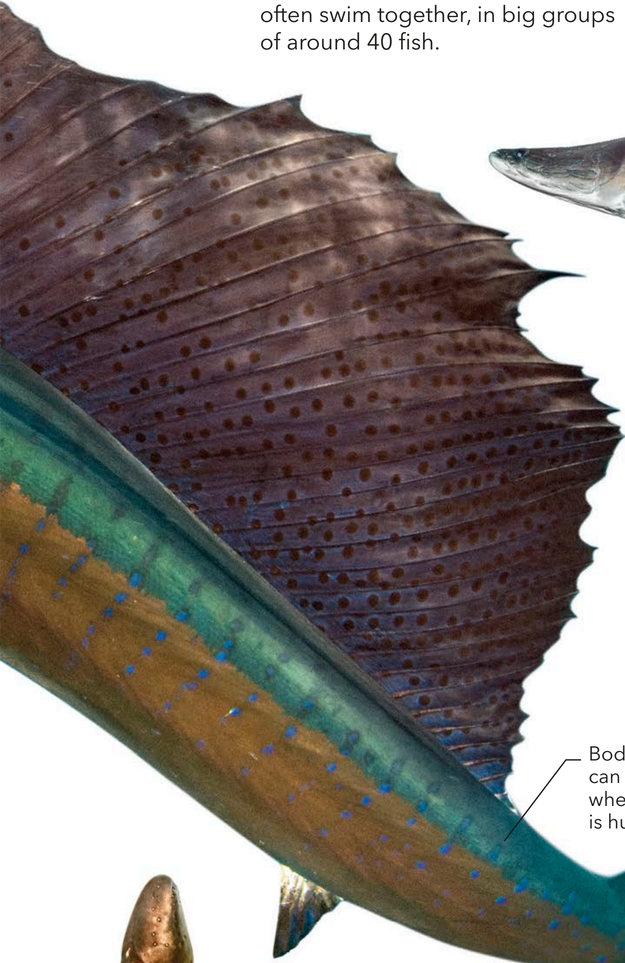
Body can weigh up to 200 kg (440 lb).

⑩ Taking in oxygen from the air instead of the water means this South American freshwater fish must visit the water's surface to breathe. As it does this it makes a loud gulping noise.



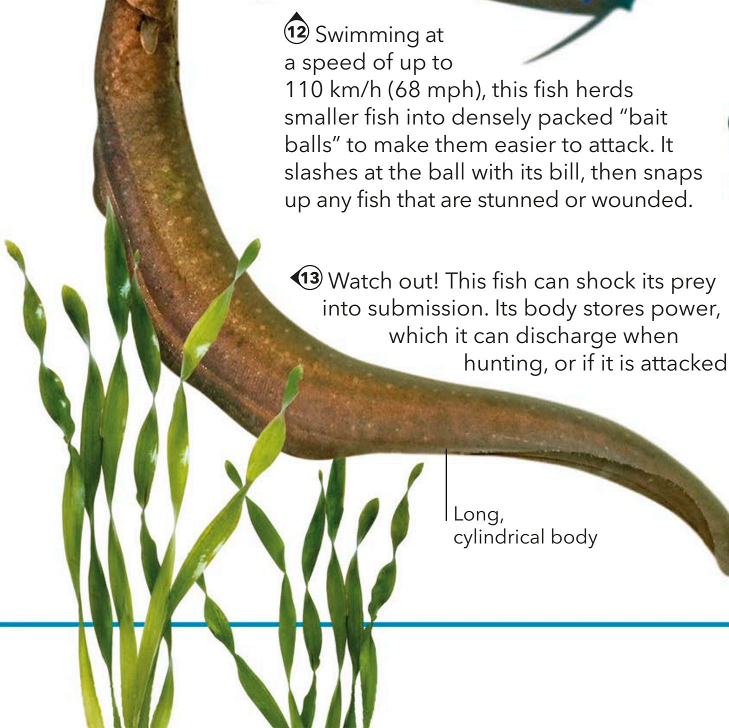
Flat, striped body

⑪ Its thin, oval-shaped body and vibrant colours make this regal fish stand out, even against the beautiful coral reefs it calls home. It often hides in rocky crevices between the corals.



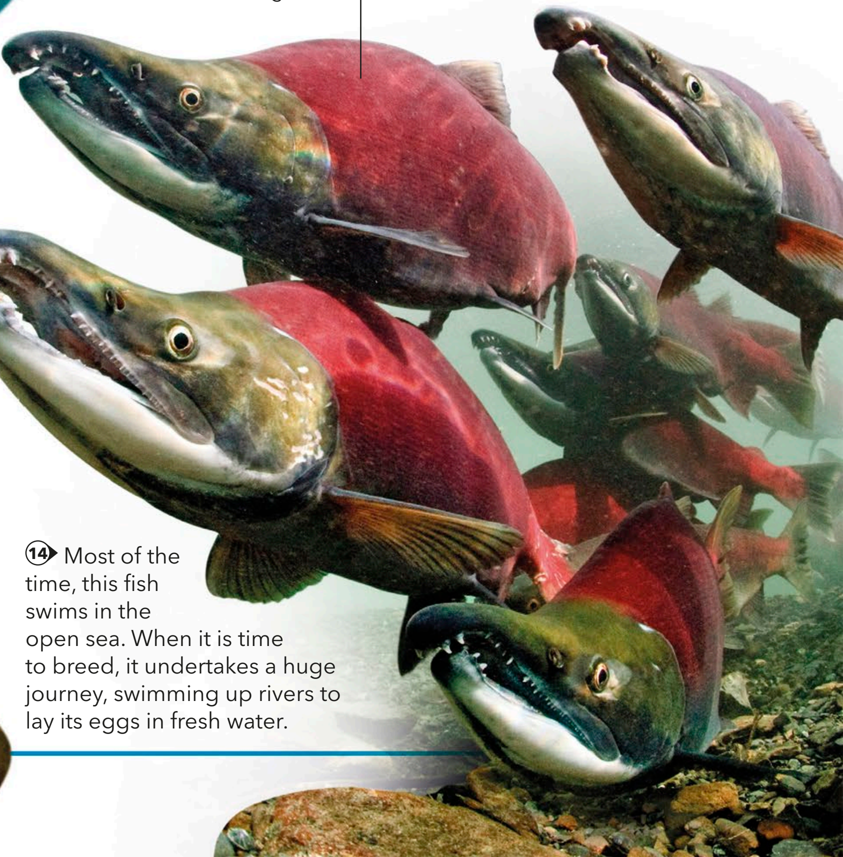
Body colour can change when the fish is hunting.

⑫ Swimming at a speed of up to 110 km/h (68 mph), this fish herds smaller fish into densely packed "bait balls" to make them easier to attack. It slashes at the ball with its bill, then snaps up any fish that are stunned or wounded.



⑬ Watch out! This fish can shock its prey into submission. Its body stores power, which it can discharge when hunting, or if it is attacked.

Long, cylindrical body



Bright red body during breeding season

⑭ Most of the time, this fish swims in the open sea. When it is time to breed, it undertakes a huge journey, swimming up rivers to lay its eggs in fresh water.

TEST YOURSELF

STARTER

- Ocean sunfish
- Pygmy seahorse
- Sockeye salmon
- Royal angelfish
- Sailfish

CHALLENGER

- **European plaice**
- **Leopard moray eel**
- **Tiger shovelnose catfish**
- **Steephead parrotfish**
- **Electric eel**

GENIUS!

- **Atlantic footballfish**
- **Oarfish**
- **Arapaima**
- **European sturgeon**

TEST YOURSELF

STARTER

- Blacktip reef shark
- Mandarin fish
- Ocellaris clownfish
- Orange-lined triggerfish
- Thorny seahorse

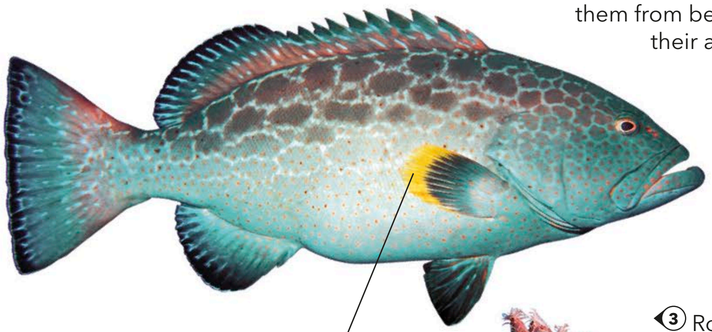
CHALLENGER

- **Bluestreak cleaner wrasse**
- **Copperband butterflyfish**
- **Lionfish**
- **Yellowfin grouper**

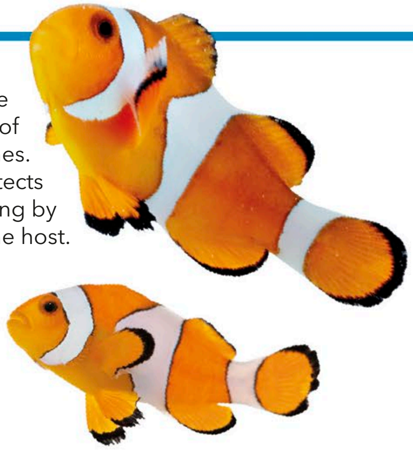
GENIUS!

- **Royal gramma**
- **Tassled scorpionfish**
- **Giant moray**

① This fish can grow big – up to 4.5 m (15 ft) long. It hunts near the bottom of the reef, searching for fish and squid, which it sucks into its mouth and swallows whole.

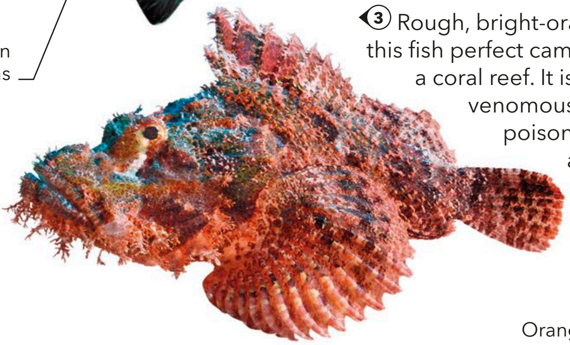


② These little fish live between the fronds of stinging sea anemones. Mucus on their skin protects them from being stung by their anemone host.

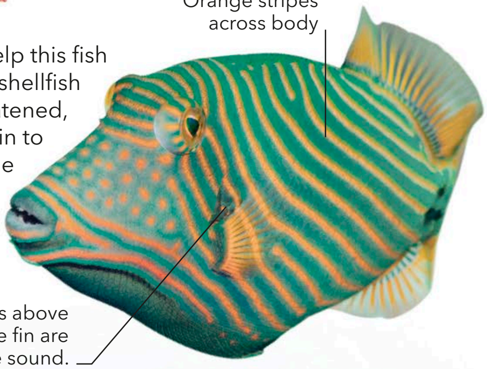


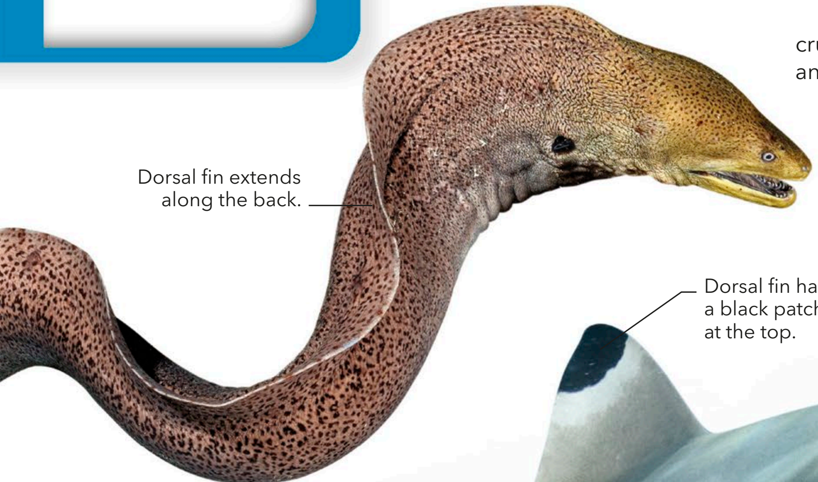
④ Caves and crevices are the perfect hiding places for this 3 m- (9¾ ft-) long fish. It waits until it can smell prey swimming past, then darts out, catching its meal with sharp, curved teeth.

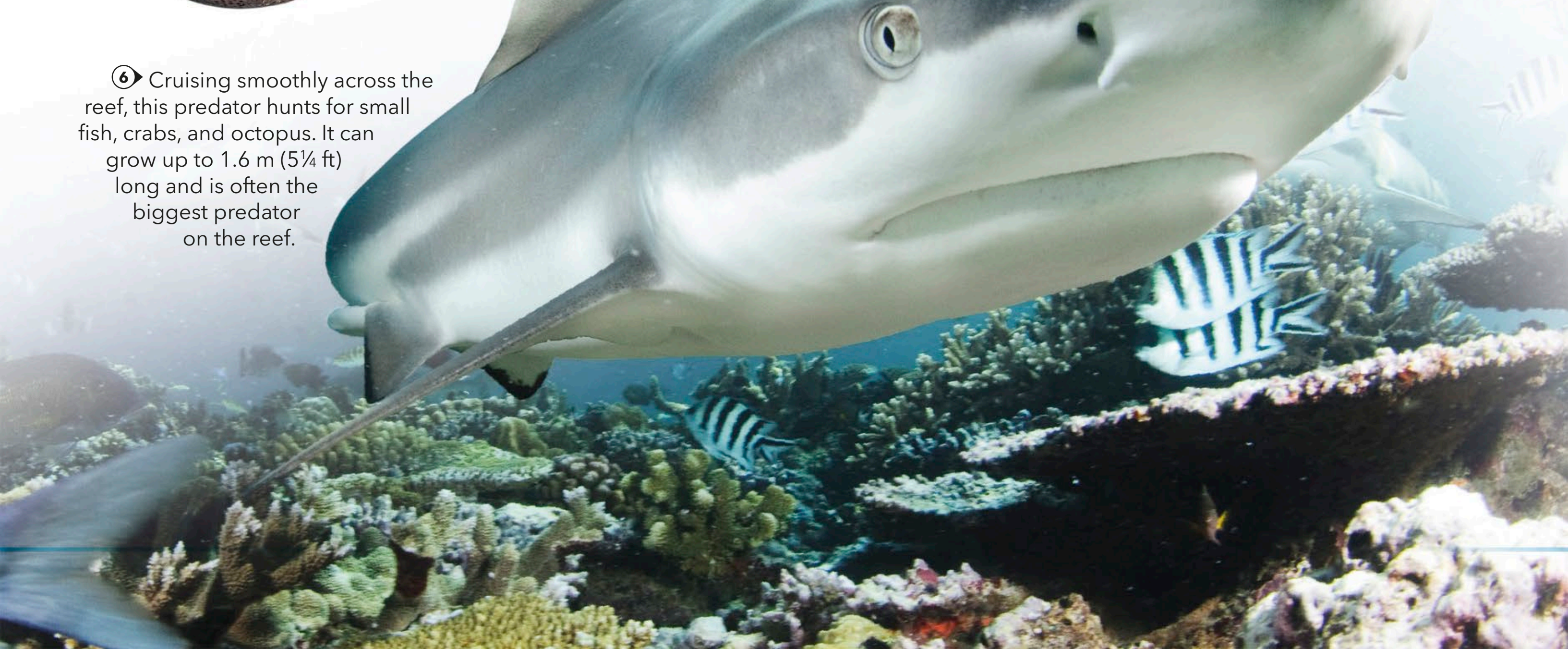
③ Rough, bright-orange scales give this fish perfect camouflage against a coral reef. It is one of the most venomous fish in the world, with poisonous spines to put off any potential predators. It has a beard of seaweed-like strands that give it its name.



⑤ Strong teeth help this fish crunch its way through shellfish and sea urchins. If threatened, it can use its dorsal fin to wedge itself inside a hole, so that predators cannot pull it out.


Orange stripes across body
Enlarged scales above the base of the fin are used to produce sound.

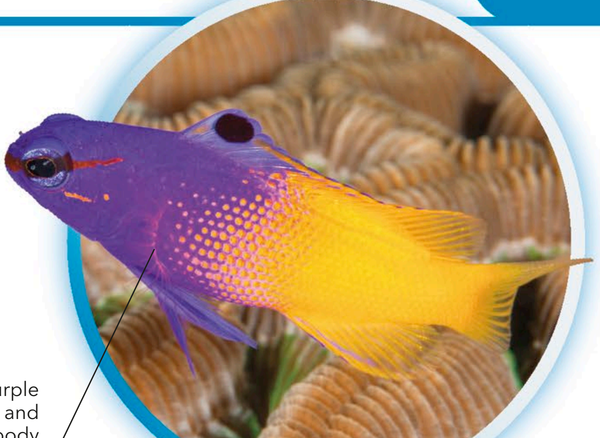




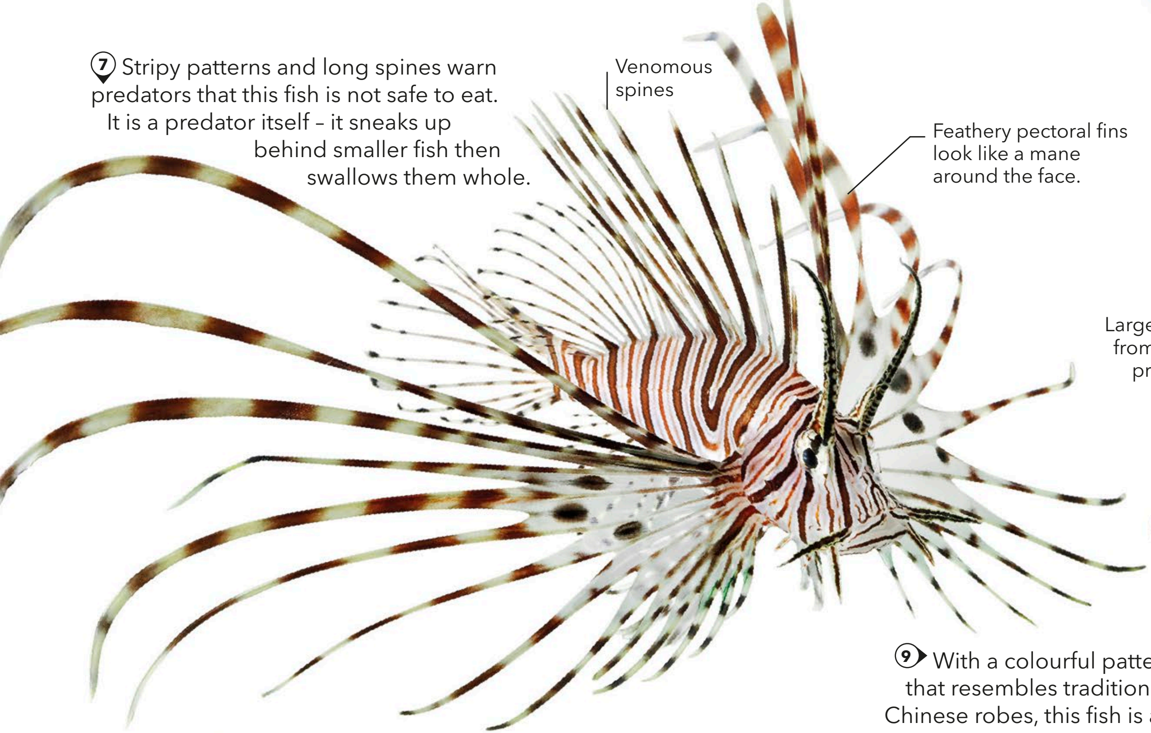
⑥ Cruising smoothly across the reef, this predator hunts for small fish, crabs, and octopus. It can grow up to 1.6 m (5¼ ft) long and is often the biggest predator on the reef.

Reef rovers

Coral reefs are tropical havens, home to a vast variety of colourful ocean life. Each coral structure is made up of thousands of tiny animals called polyps. When a polyp dies, its rocky skeleton remains, and new polyps grow on top. Over time they build up, becoming coral reefs that provide food and shelter to thousands of animals.

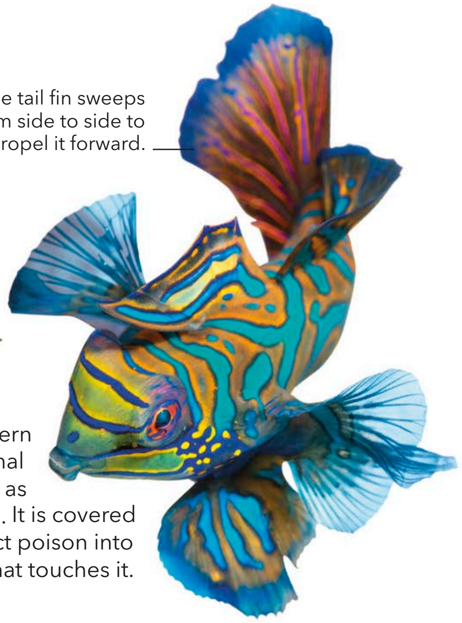

Striking purple head and front body

⑧ Tiny plankton and shellfish make up most of this fish's diet. Sometimes it also eats tiny parasites off the bodies of bigger fish. It gets its name from its regal purple colour.

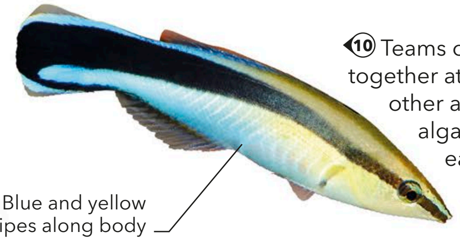

Venomous spines

Feathery pectoral fins look like a mane around the face.

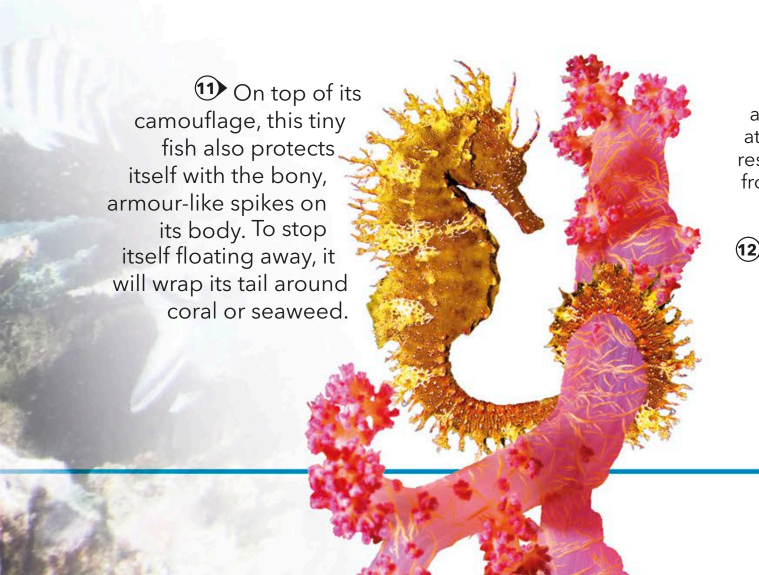
⑦ Stripy patterns and long spines warn predators that this fish is not safe to eat. It is a predator itself – it sneaks up behind smaller fish then swallows them whole.

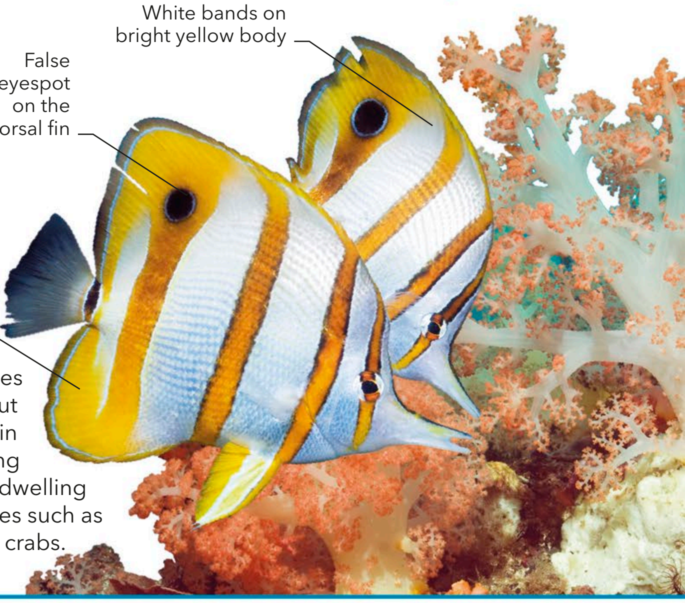

Large tail fin sweeps from side to side to propel it forward.

⑨ With a colourful pattern that resembles traditional Chinese robes, this fish is as dangerous as it is beautiful. It is covered in tiny spines that inject poison into anything that touches it.


Blue and yellow stripes along body

⑩ Teams of these fish work together at cleaning stations, where other animals come to get rid of algae and dead tissues. They eat the parasites that live on the larger fish that come to be cleaned.


⑪ On top of its camouflage, this tiny fish also protects itself with the bony, armour-like spikes on its body. To stop itself floating away, it will wrap its tail around coral or seaweed.


White bands on bright yellow body

False eyespot on the dorsal fin

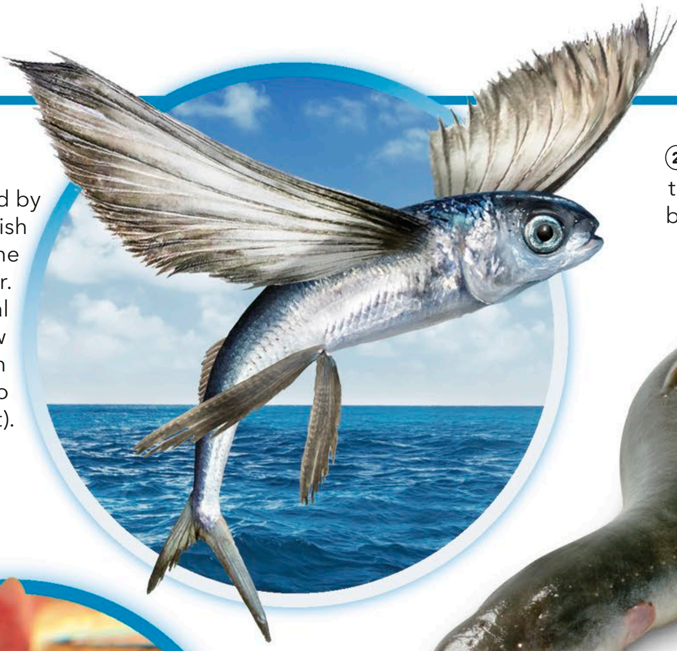
Bright colour appears faded at night to help resting fish hide from predators.

⑫ This stripy fish uses its long beaky snout to poke into holes in the reef, searching for small, bottom-dwelling invertebrates such as worms and crabs.

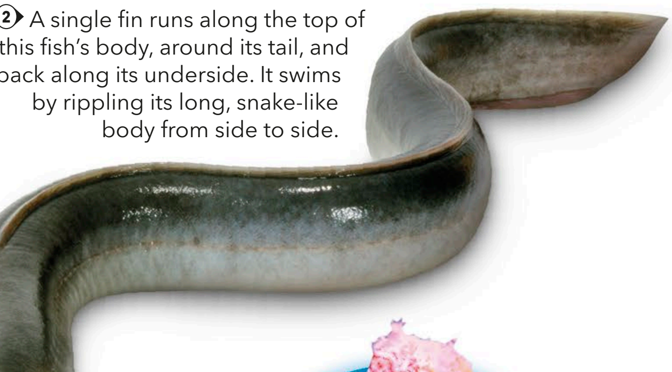
ANSWERS: 1. Yellowfin grouper 2. Ocellaris clownfish 3. Tasseled scorpionfish 4. Giant moray 5. Orange-lined triggerfish 6. Blacktip reef shark 7. Lionfish 8. Royal gramma 9. Mandarin fish 10. Bluestreak cleaner wrasse 11. Thorny seahorse 12. Copperband butterflyfish

Fish bodies and fins

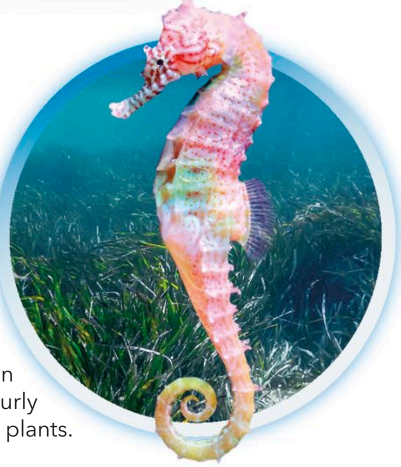
Fish have strong muscles attached to their bendy backbones. These enable them to wriggle their bodies from side to side, and flap the tail fin to push the fish through the water. Other fins help fish to steer, and keep their bodies stable in the water. The animals on these pages show just how different fish bodies can be.



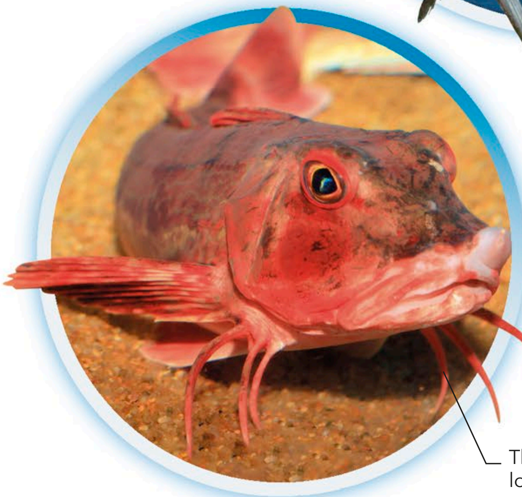
① When threatened by a predator, this fish leaps up out of the water and into the air. Wing-like pectoral fins on its sides allow it to glide through the air for up to 50 m (164 ft).



② A single fin runs along the top of this fish's body, around its tail, and back along its underside. It swims by rippling its long, snake-like body from side to side.

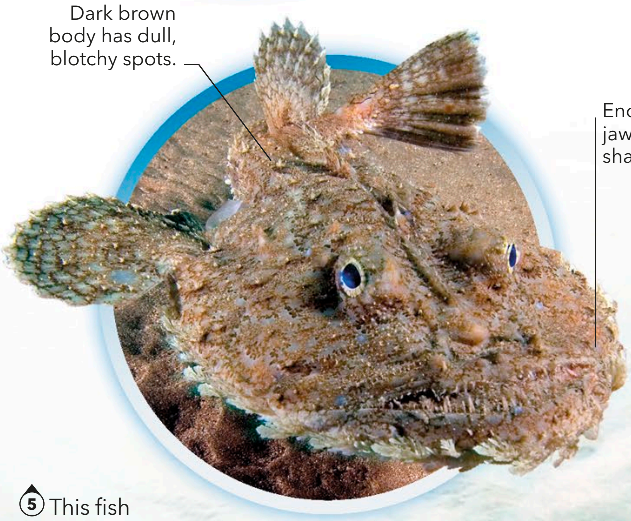


③ Holding its body vertical in the water, this small fish, about 5 cm (2 in) long, moves along very slowly, powered by the tiny dorsal fin on its back. It uses its curly tail to grip weeds and plants.



④ Three spines of this fish's pectoral fins are separate from the main fin. They allow it to feel around for tiny prey hiding in the sand or mud.

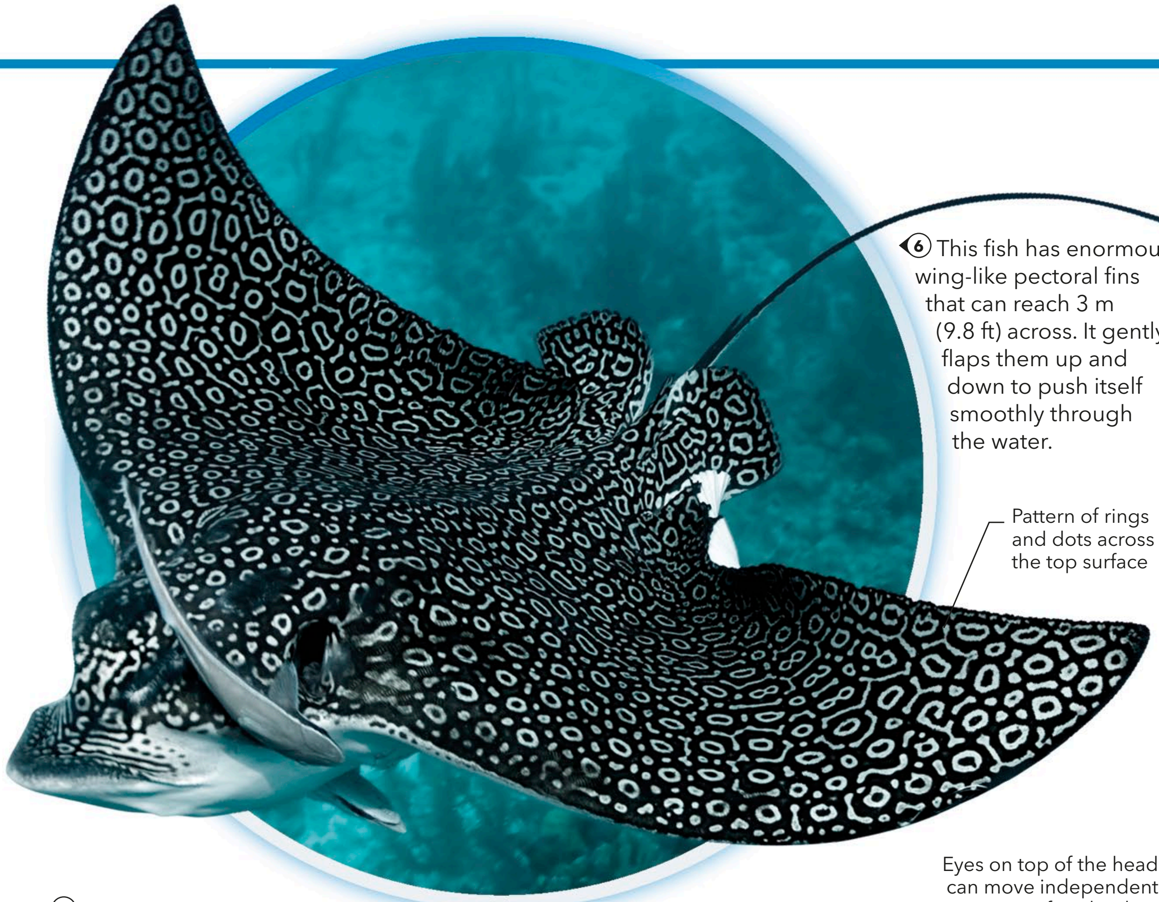
The modified fins look like fingers.



Dark brown body has dull, blotchy spots.

Enormous jaws contain sharp teeth.

⑤ This fish prefers to live in the shallow seabed. With a wide, slightly flat head and tapering body, it is well camouflaged as it sits still and waits for prey. It uses its powerful pectoral fins to walk along the seafloor.



⑥ This fish has enormous, wing-like pectoral fins that can reach 3 m (9.8 ft) across. It gently flaps them up and down to push itself smoothly through the water.

Pattern of rings and dots across the top surface

TEST YOURSELF

STARTER

- Rainbow trout
- Yellow boxfish
- European eel
- Dwarf seahorse

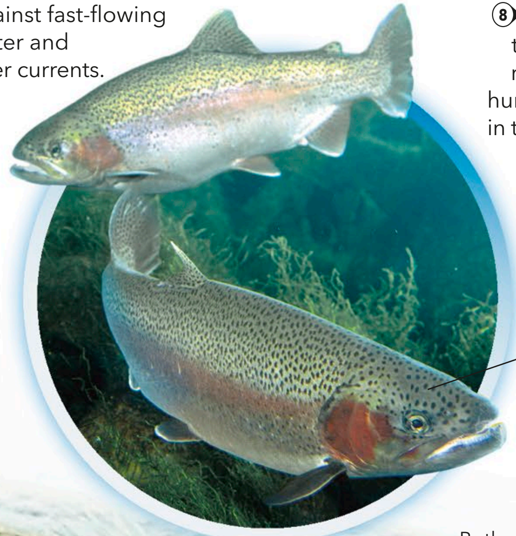
CHALLENGER

- **Atlantic flying fish**
- **Spotted eagle ray**
- **Red gurnard**

GENIUS!

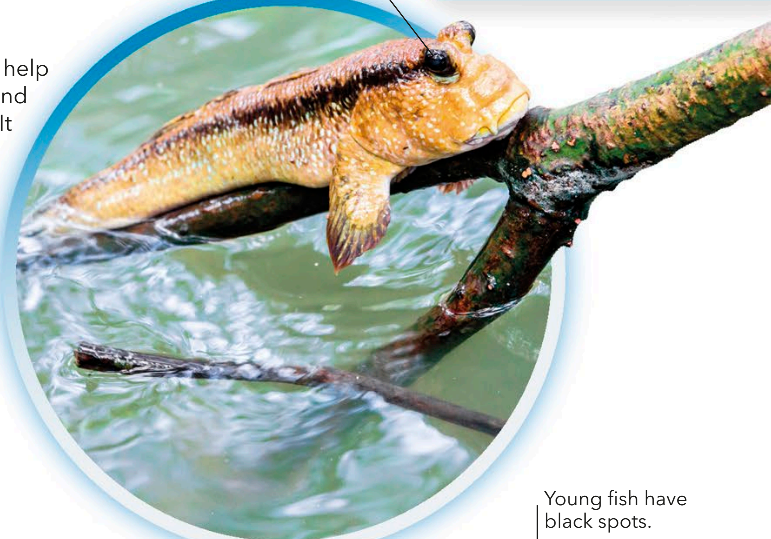
- **Blue-spotted mudskipper**
- **Shallow-water anglerfish**
- **Southern flounder**

⑦ Sleek and strong, this fish uses its body and tail to move forwards. It swims for long distances, often battling against fast-flowing water and river currents.



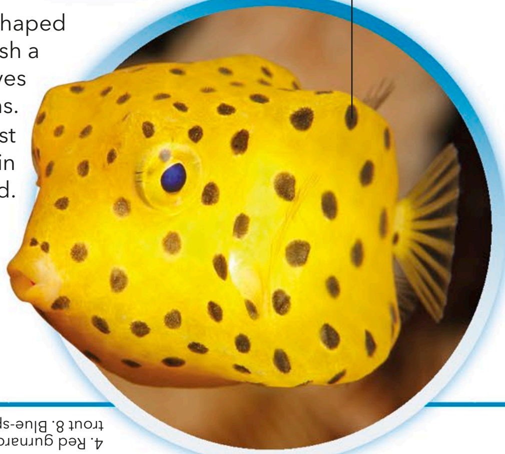
Dark speckles on multi-coloured, shiny body

⑧ Strong, limb-like fins help this fish pull itself up and right out of the water. It hunts worms and insects in the mud, breathing in oxygen from water stored in pockets inside its gills.



Eyes on top of the head can move independent of each other.

⑨ A solid, square-shaped body makes this fish a slow swimmer. It moves around by fluttering its fins. Since it cannot swim away fast enough, it releases a deadly toxin from its skin when threatened.

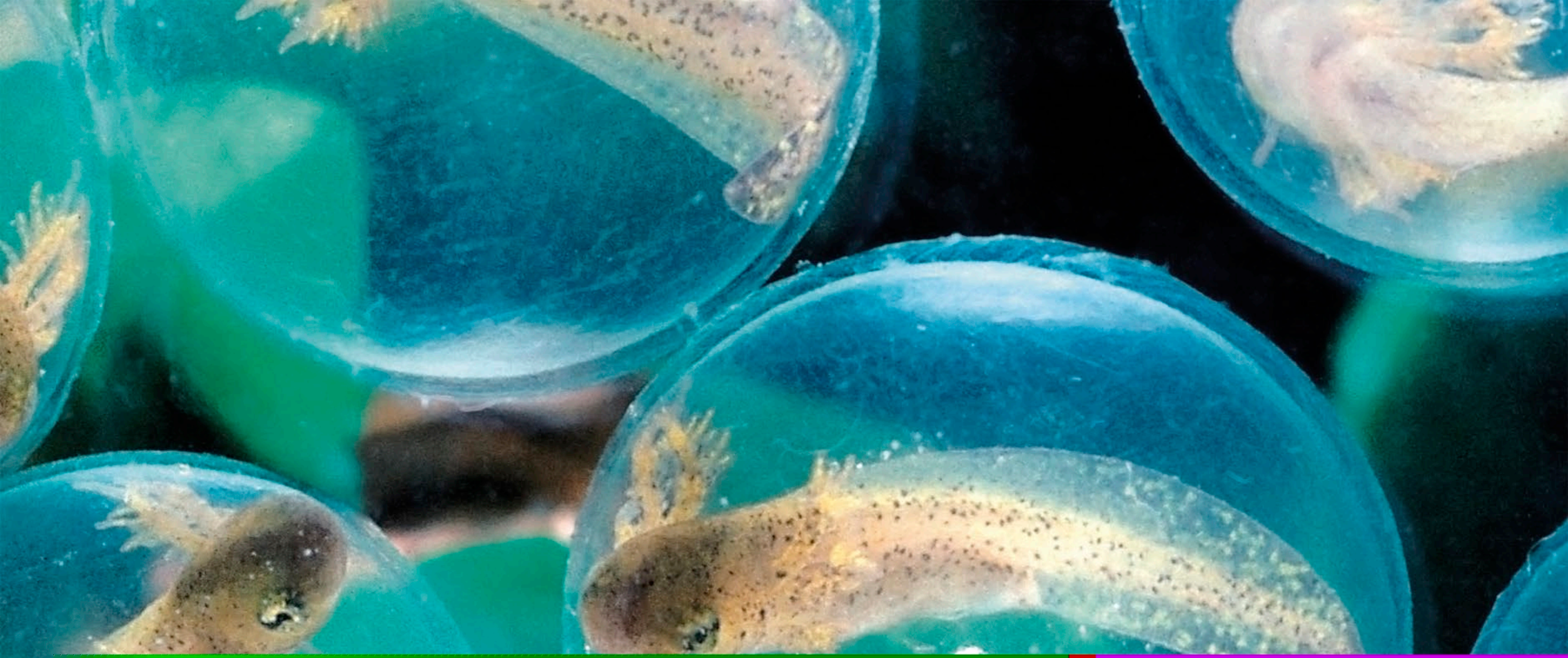


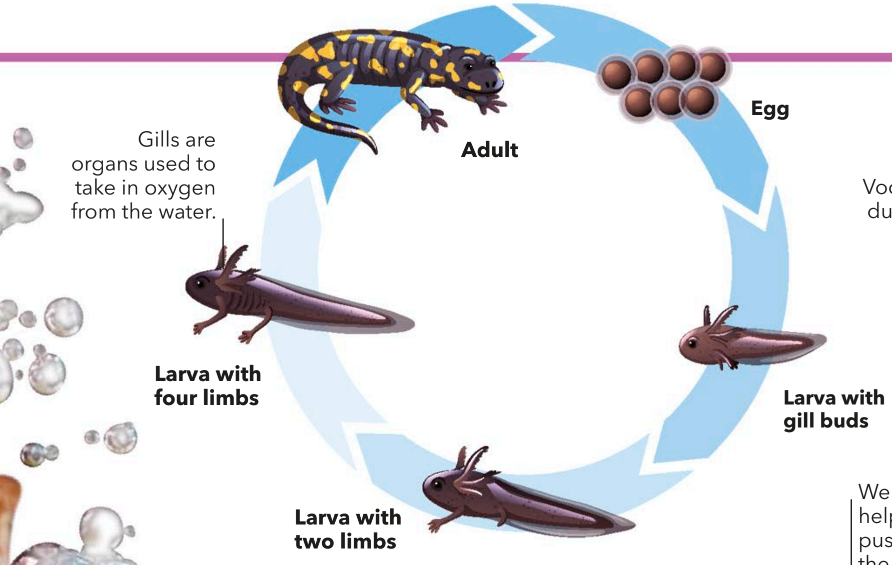
Young fish have black spots.

Both eyes are on the same side of the body.

⑩ This fish has a flat, oval-shaped body. It swims by rippling its whole body up and down in wave motions that push it forwards over the seabed.

ANSWERS: 1. Atlantic flying fish 2. European eel 3. Dwarf seahorse 4. Red gurnard 5. Shallow-water anglerfish 6. Spotted eagle ray 7. Rainbow trout 8. Blue-spotted mudskipper 9. Yellow boxfish 10. Southern flounder





Salamander life cycle

Over its life, a salamander's body undergoes significant changes. It starts as an egg. The egg hatches into a larva in 19–50 days, which slowly develops gills, eventually becoming an adult in 2–5 months.

03. Kick hard with your powerful hindlegs and use your webbed feet to push forwards.

Croaking

Male frogs and toads croak to attract females, and the louder they croak the more likely they are to succeed in finding a mate. Each species of frog and toad has its own unique croak.

Deadly defences

Found only in Colombia, the golden poison-dart frog is one of the most toxic animals on Earth. It stores its poison in its skin.

The tiny phantasmal poison frog only grows up to 4 cm (1½ in) in length, but still carries enough poison to kill a human.

Just touching the skin of the red-headed poison frog (below) would be enough to make you violently ill.

I don't believe it!

The tadpole of the South American paradoxical frog is three times the size of the adult frog. It can be up to 25 cm (10 in) long, shrinking as it gets older.

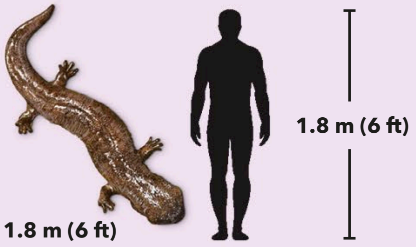
In numbers

60
The number of days a male Darwin's frog keeps tadpoles in his vocal sac after hatching. He then coughs up tiny frogs.

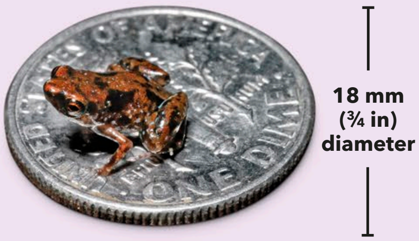
24 km/h
(15 mph) The maximum speed of the Andean salamander, the world's fastest amphibian.

3 kg
(6½ lb) The weight of a single adult goliath frog.

Biggest and smallest



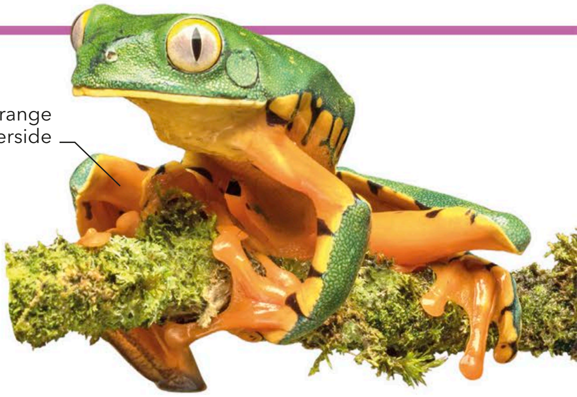
The biggest of all amphibians is the colossal Chinese giant salamander. It lives in streams and rivers in central China.



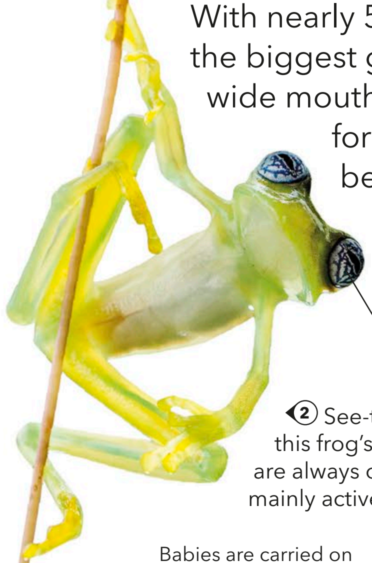
The tiniest amphibian is a frog, *Paedophryne amauensis*, from Papua New Guinea. Shown here on a US dime, it is 7 mm (¼ in) long.

Frogs and toads

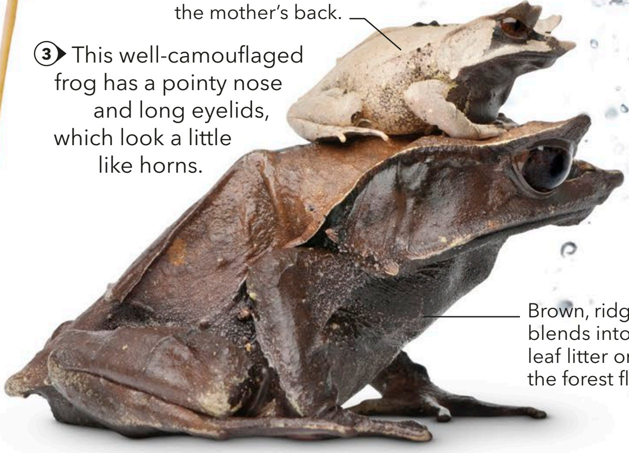
With nearly 5,900 species, frogs and toads make up the biggest group of amphibians. These animals have wide mouths, eyes that stick out, and back legs used for leaping. There is no real scientific difference between frogs and toads, though most frogs have smoother, shinier skin.


Bright orange underside

① This magnificently coloured frog spreads its webbed feet to glide between the tops of trees in South American rainforests.

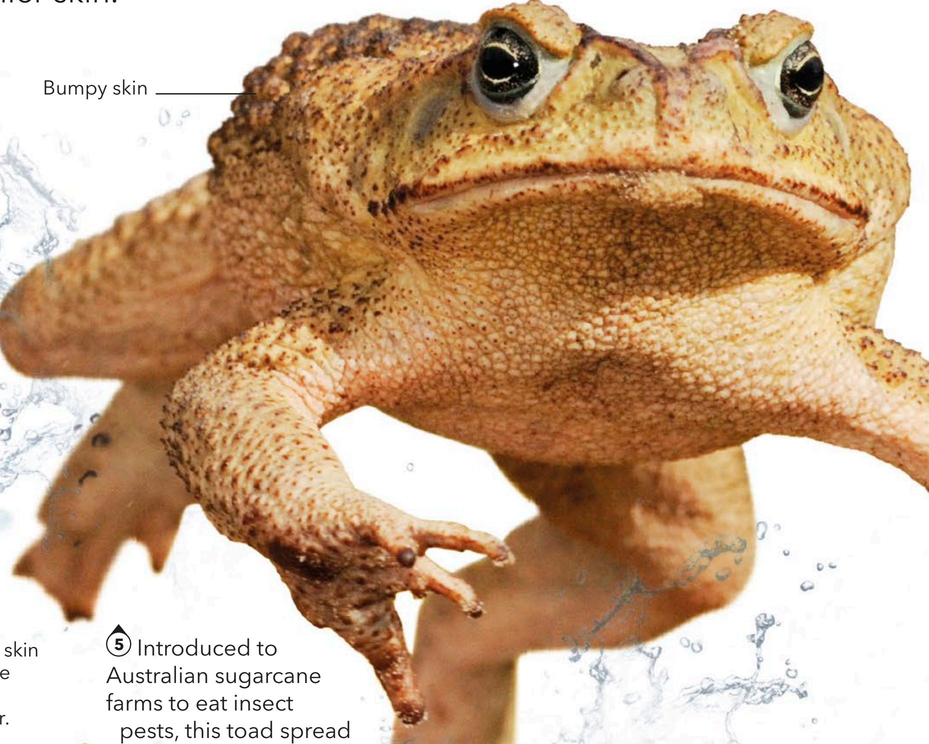

Silvery eyes with black markings

② See-through skin means this frog's veins and organs are always on display. It is mainly active at night.

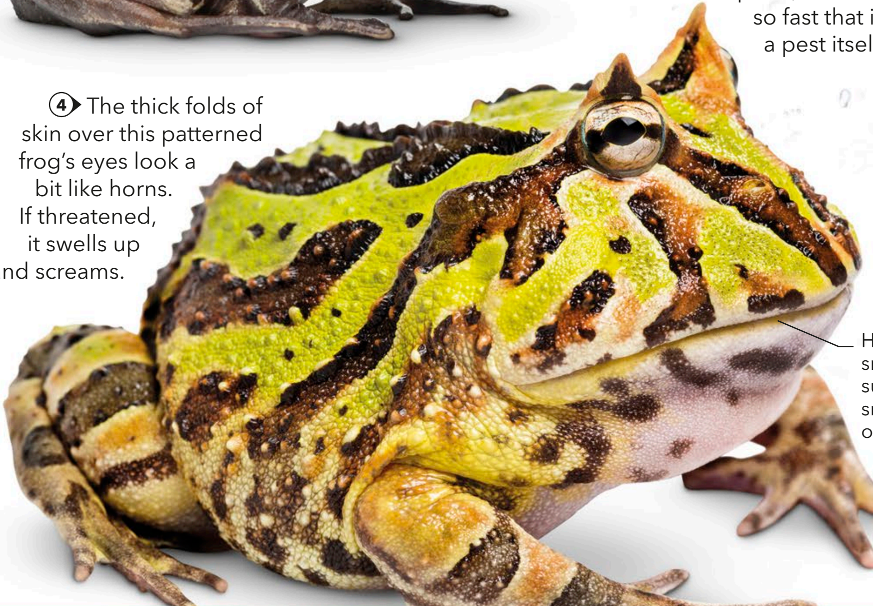

Babies are carried on the mother's back.

③ This well-camouflaged frog has a pointy nose and long eyelids, which look a little like horns.

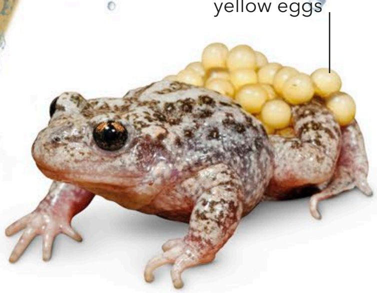
Brown, ridged skin blends into the leaf litter on the forest floor.


Bumpy skin

⑤ Introduced to Australian sugarcane farms to eat insect pests, this toad spread so fast that it is now a pest itself.

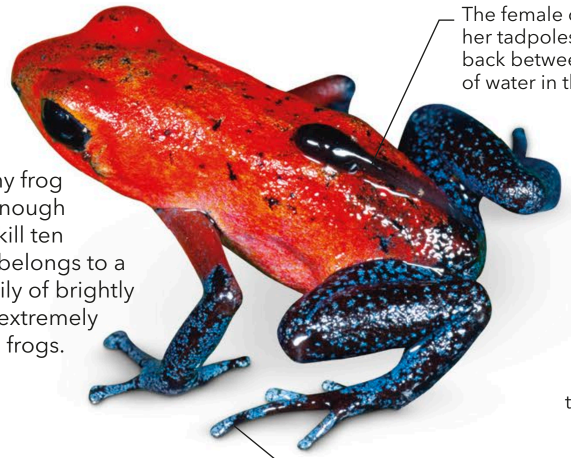

④ The thick folds of skin over this patterned frog's eyes look a bit like horns. If threatened, it swells up and screams.

Huge mouth snatches prey such as mice, small birds, and other frogs.


Strands of large, yellow eggs

⑥ These European toads are very careful with their eggs – the male carries them around on his back until they hatch.

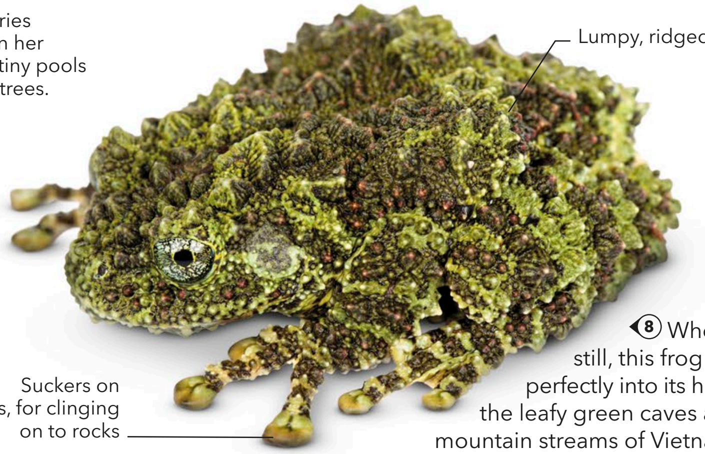
ANSWERS: 1. Splendid leaf frog 2. Limon giant glass frog 3. Long-nosed horned frog 4. Ornate horned frog 5. Cane toad 6. Midwife toad 7. Strawberry poison dart frog 8. Mossy frog 9. European common toad 10. European fire-bellied toad 11. Tomato frog 12. European common frog



⑦ This tiny frog contains enough poison to kill ten people. It belongs to a whole family of brightly coloured, extremely poisonous frogs.

The female carries her tadpoles on her back between tiny pools of water in the trees.

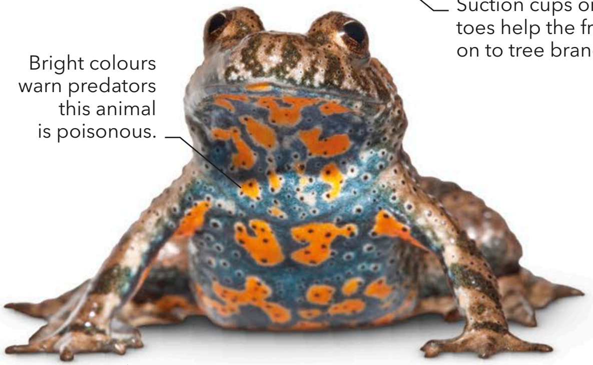
Suction cups on the toes help the frog cling on to tree branches.



Lumpy, ridged skin

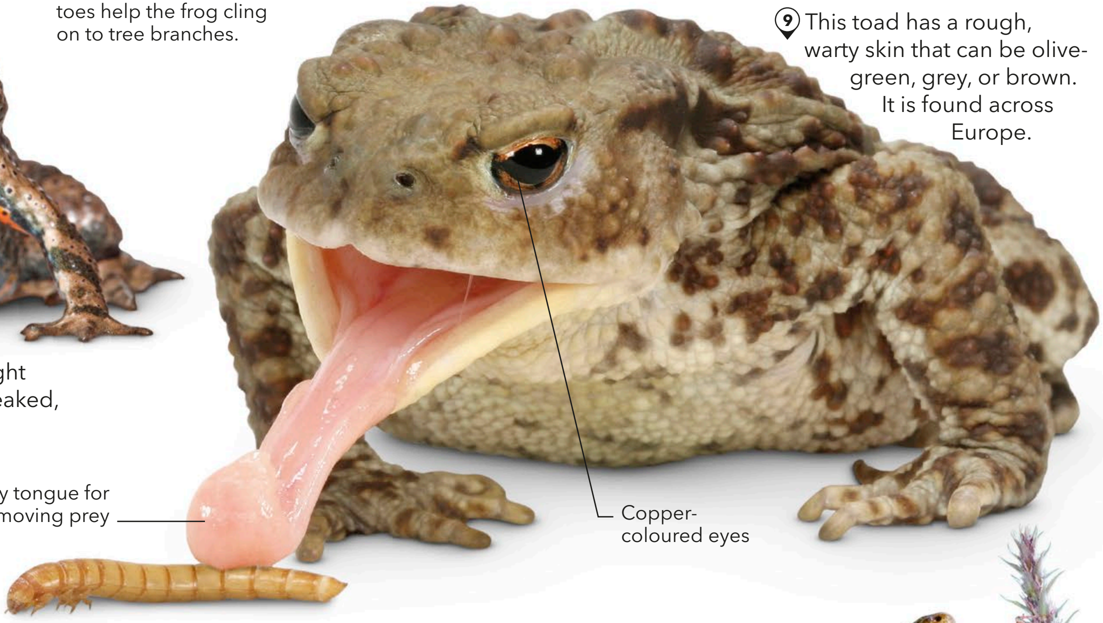
Suckers on toes, for clinging on to rocks

⑧ When still, this frog blends perfectly into its habitat – the leafy green caves and mountain streams of Vietnam.



Bright colours warn predators this animal is poisonous.

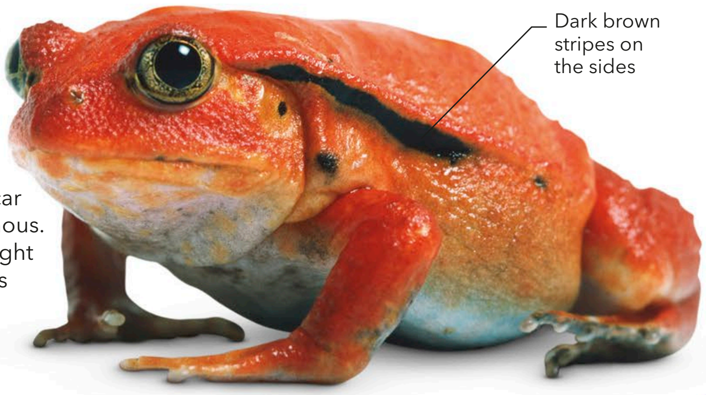
⑩ Dull from above, but bright beneath, this toad has a streaked, flame-red underbelly.



⑨ This toad has a rough, warty skin that can be olive-green, grey, or brown. It is found across Europe.

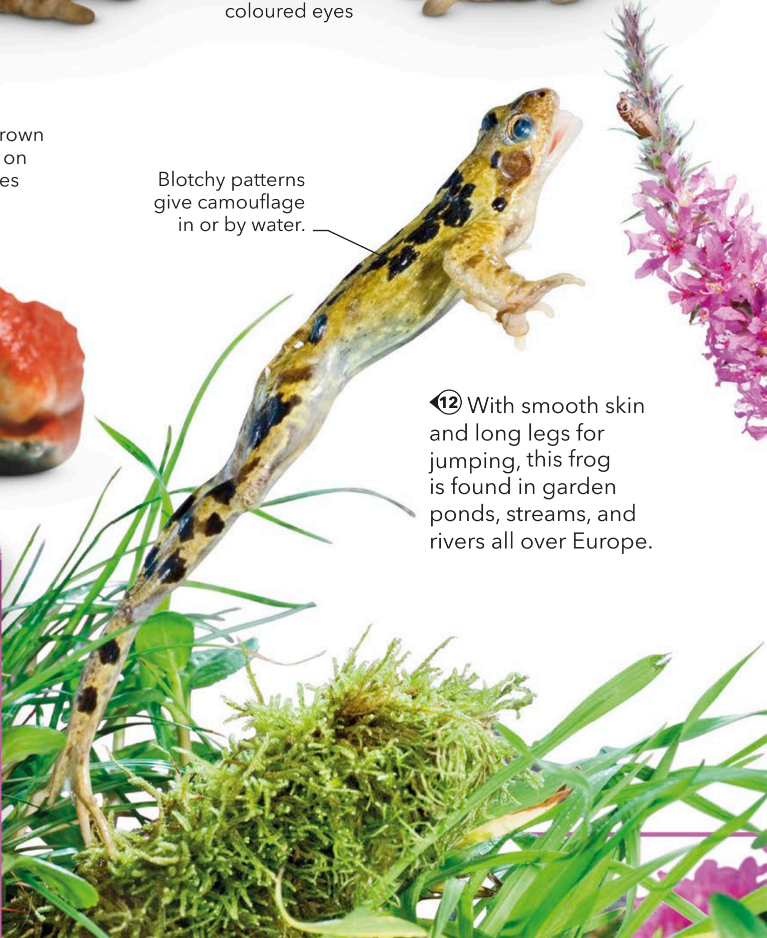
Long, sticky tongue for catching moving prey

Copper-coloured eyes



Dark brown stripes on the sides

⑪ This frog from Madagascar is highly poisonous. Females are bright red, while males are orange or yellow.



Blotchy patterns give camouflage in or by water.

⑫ With smooth skin and long legs for jumping, this frog is found in garden ponds, streams, and rivers all over Europe.

TEST YOURSELF

STARTER

Tomato frog
Strawberry poison dart frog
Mossy frog
Ornate horned frog

CHALLENGER

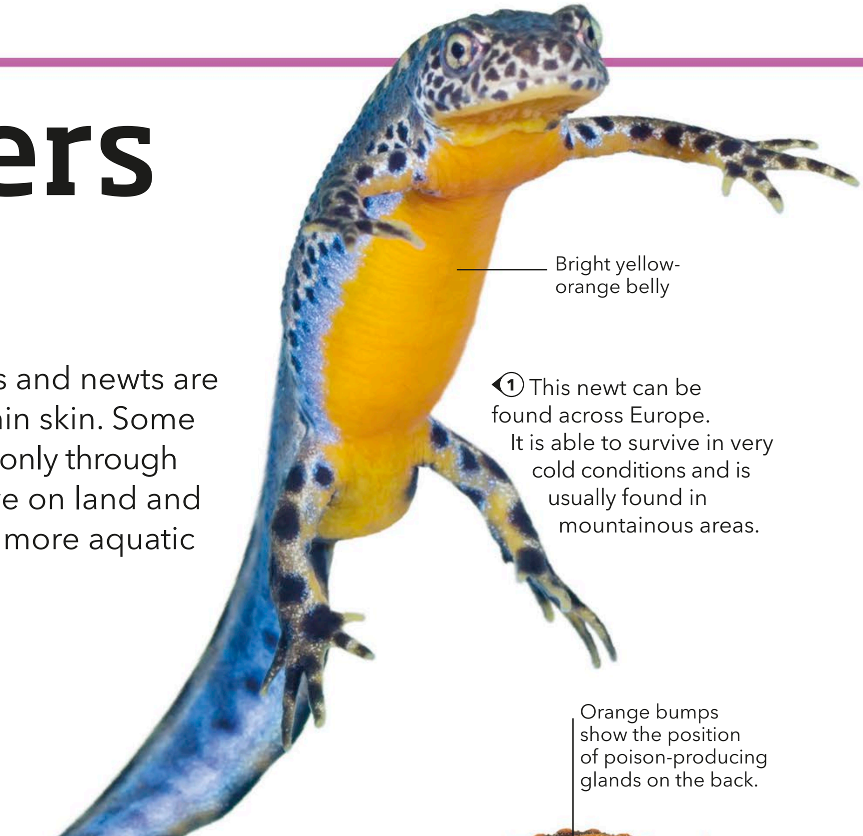
Limon giant glass frog
Long-nosed horned frog
European common toad
European common frog

GENIUS!

Splendid leaf frog
Cane toad
European fire-bellied toad
Midwife toad

Salamanders and newts

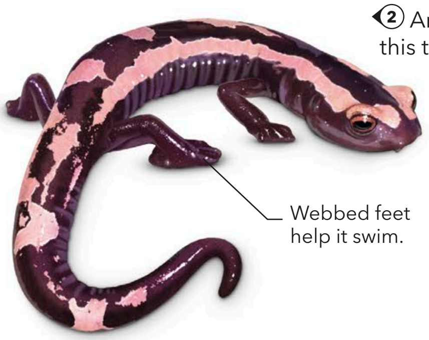
They look similar to lizards, but salamanders and newts are amphibians able to breathe through their thin skin. Some salamanders are even lungless and breathe only through their skin. While a majority of salamanders live on land and return to the water only to breed, newts are more aquatic than most salamanders.



Bright yellow-orange belly

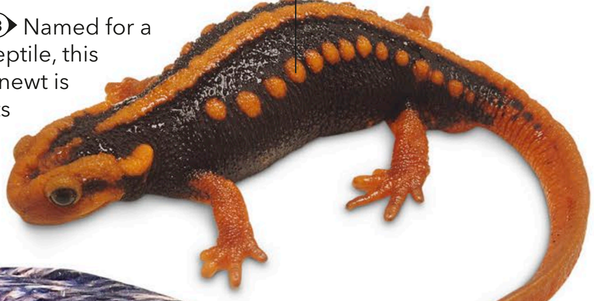
① This newt can be found across Europe. It is able to survive in very cold conditions and is usually found in mountainous areas.

Flat tail with blue markings



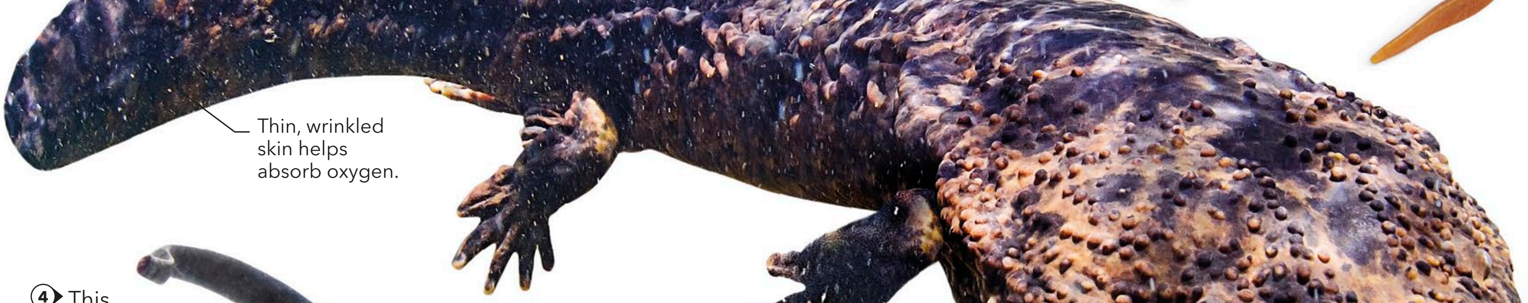
② An unusual hunter, this tropical tree-living amphibian shoots its long tongue with a sticky tip to catch its prey.

Webbed feet help it swim.



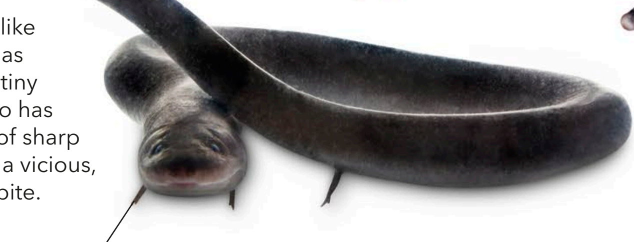
③ Named for a large reptile, this knobbly newt is found in parts of Asia. It has a prominent orange ridge on its spine.

Orange bumps show the position of poison-producing glands on the back.



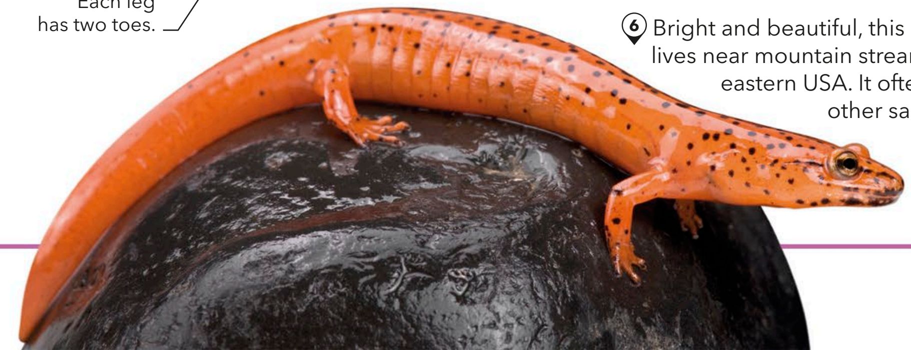
Thin, wrinkled skin helps absorb oxygen.

⑤ This enormous salamander is the second-largest amphibian in the world, growing up to 1.4 m (4½ ft) long. It digests food slowly, and can go for weeks without eating.

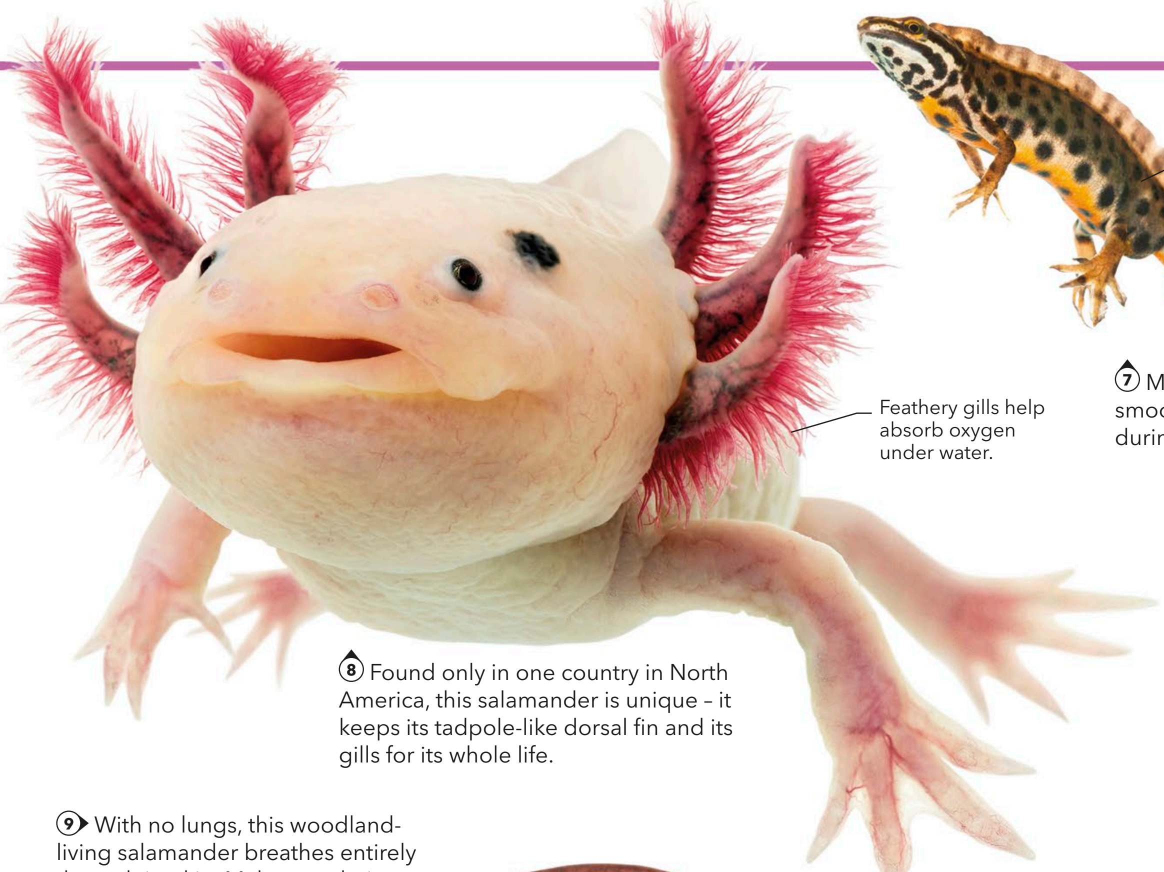


④ This large, eel-like creature has unusually tiny legs. It also has two rows of sharp teeth and a vicious, powerful bite.

Each leg has two toes.

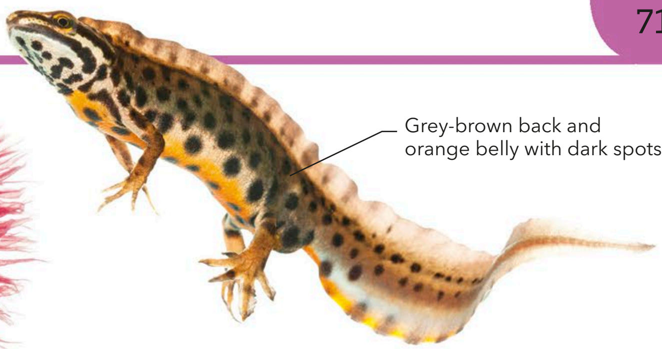


⑥ Bright and beautiful, this salamander lives near mountain streams in eastern USA. It often eats other salamanders.



Feathery gills help absorb oxygen under water.

⑧ Found only in one country in North America, this salamander is unique – it keeps its tadpole-like dorsal fin and its gills for its whole life.



Grey-brown back and orange belly with dark spots

⑦ Males of this species develop a smooth crest along their back and tail during the breeding season.

TEST YOURSELF

STARTER

- Blue-spotted salamander
- Axolotl
- Red salamander
- Alpine newt

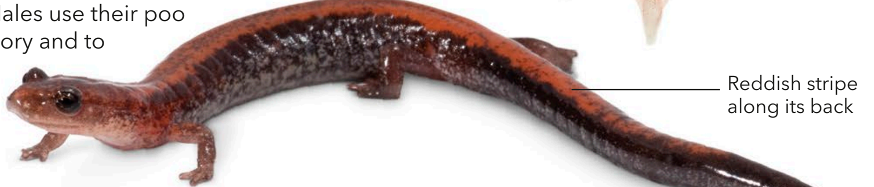
CHALLENGER

- **Red-backed salamander**
- **Two-toed amphiuma**
- **Tiger salamander**
- **Japanese giant salamander**

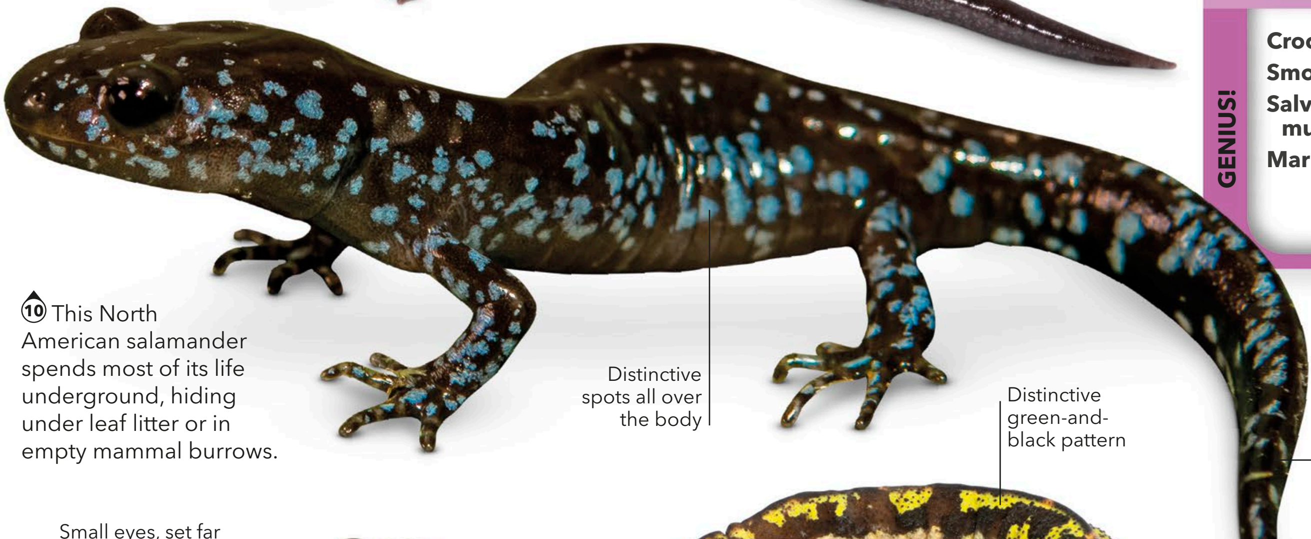
GENIUS!

- **Crocodile newt**
- **Smooth newt**
- **Salvin's mushroomtongue**
- **Marbled newt**

⑨ With no lungs, this woodland-living salamander breathes entirely through its skin. Males use their poo to mark their territory and to attract females.



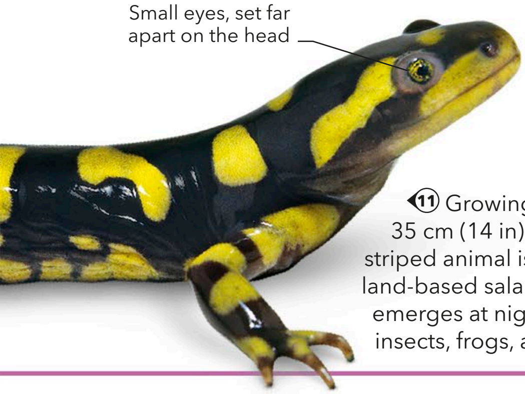
Reddish stripe along its back



Distinctive spots all over the body

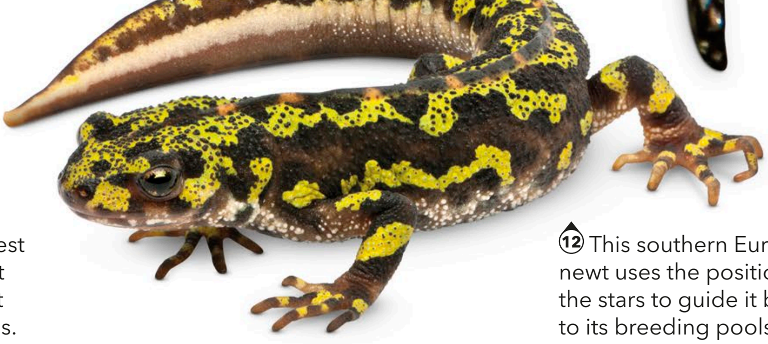
Long tail

⑩ This North American salamander spends most of its life underground, hiding under leaf litter or in empty mammal burrows.



Small eyes, set far apart on the head

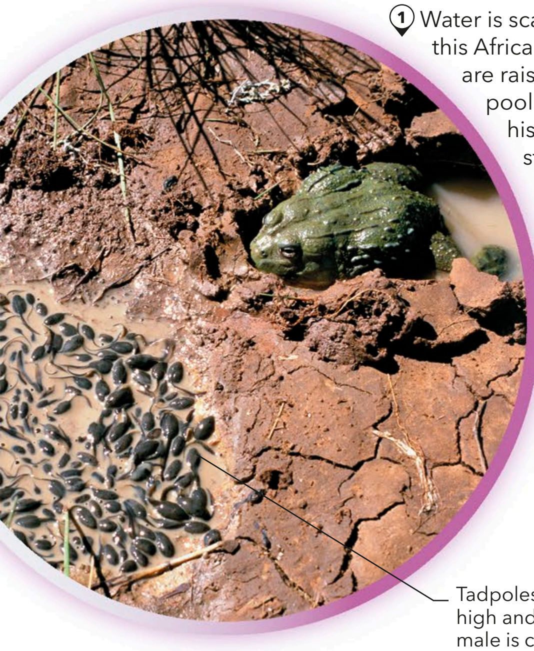
⑪ Growing up to 35 cm (14 in) long, this striped animal is the largest land-based salamander. It emerges at night to hunt insects, frogs, and worms.



Distinctive green-and-black pattern

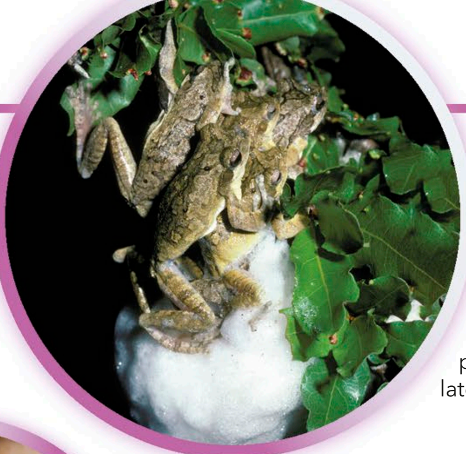
⑫ This southern European newt uses the position of the stars to guide it back to its breeding pools.

ANSWERS: 1. Alpine newt 2. Salvin's mushroomtongue 3. Crocodile newt 4. Two-toed amphiuma 5. Japanese giant salamander 6. Red salamander 7. Smooth newt 8. Axolotl 9. Red-backed salamander 10. Blue-spotted salamander 11. Tiger salamander 12. Marbled newt

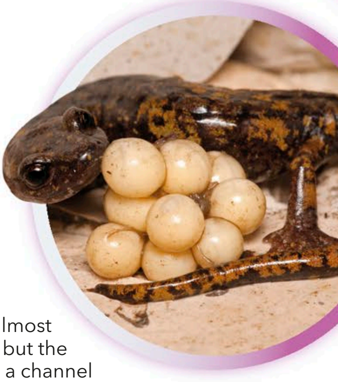


① Water is scarce in the areas where this African frog lives, and tadpoles are raised in puddles, rather than pools. The male watches over his tadpoles. If their puddle starts drying up, he digs a channel to one that is full of water, to top it up.

Tadpoles are almost high and dry – but the male is cutting a channel from a full puddle.



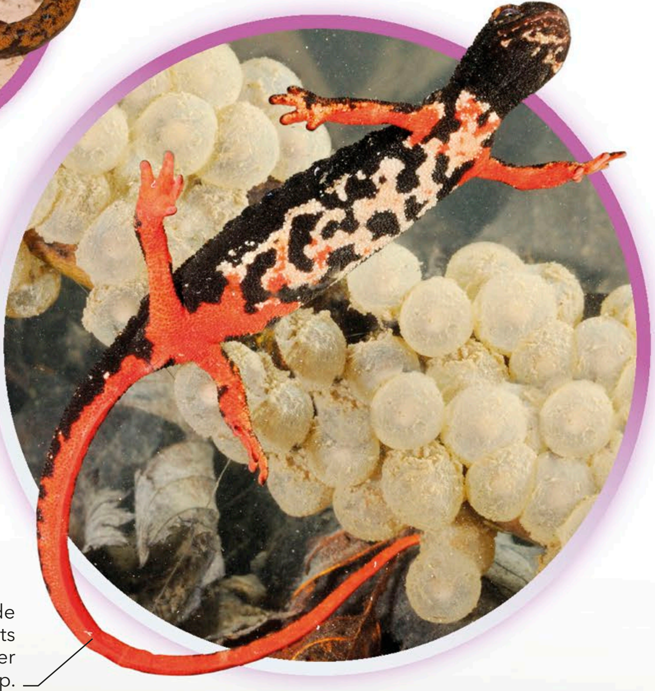
② When pairs of these frogs mate, they kick up a wet froth, into which the female lays her eggs. The spray dries with a hard crust, which protects the eggs and, later, the tadpoles.



③ Unlike most salamanders that lay their eggs in water, this species lays them in cool, damp, dark places on land. The female wraps herself tightly around her eggs until they hatch.

New life

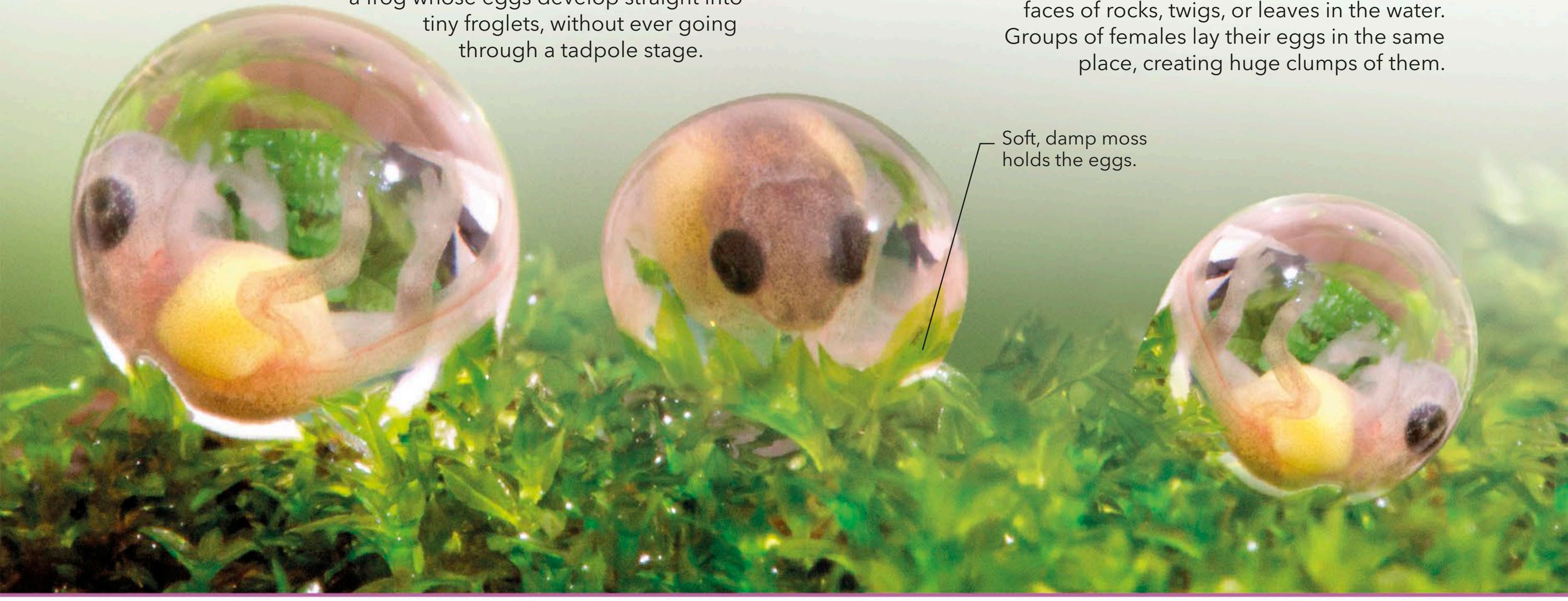
Amphibians lay eggs that usually develop into aquatic tadpoles. The eggs must not dry out, so they are laid in water or damp places. Many amphibians lay eggs then leave, but some carefully watch over their young. Can you name these amphibian parents raising their young in lots of different ways?



The red underside of the tail contrasts with the darker colour on top.

④ This amphibian attaches its eggs to the faces of rocks, twigs, or leaves in the water. Groups of females lay their eggs in the same place, creating huge clumps of them.

⑤ Wet Indian jungles are the habitat of a frog whose eggs develop straight into tiny froglets, without ever going through a tadpole stage.



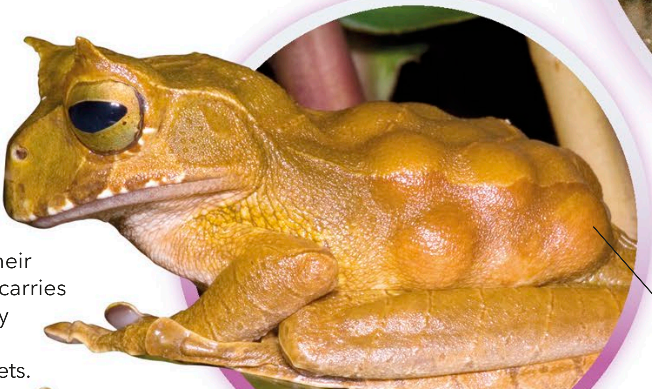
Soft, damp moss holds the eggs.

ANSWERS: 1. African bullfrog 2. Grey foam-nest tree frog 3. Strinati's cave salamander 4. Northern spectacled salamander 5. Amboli bush frog 6. Common frog 7. Common toad 8. Eyelash marsupial frog 9. Red-eyed tree frog 10. Ringed caecilian

⑥ Clumps of this familiar frog's jelly-like eggs fill ponds in Europe and Asia in the springtime. It needs to lay so many because only one in fifty make it to adulthood.

⑦ The male toad fertilizes the eggs as the female lays them, two long thin strands at a time. The eggs will hatch two or three weeks later.

Each black egg lies in a ball of jelly that floats in the water.

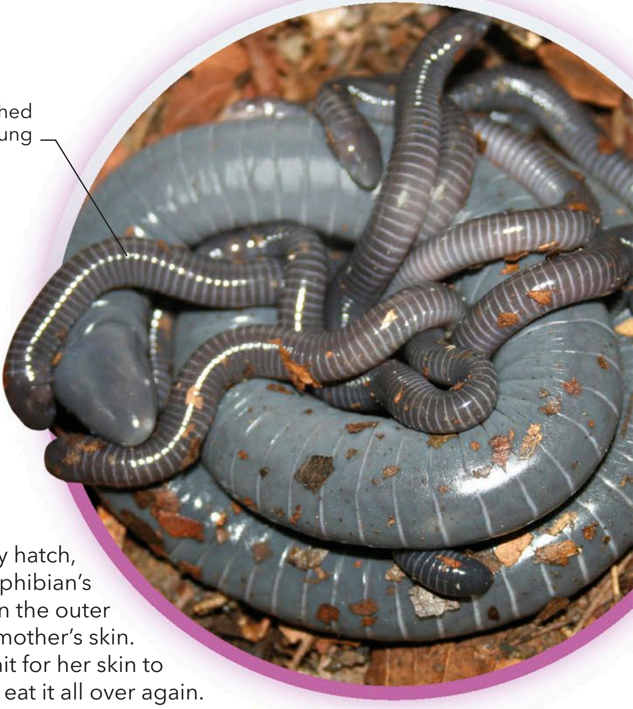


⑧ This frog lives high up in rainforest trees. Its eggs do not develop in water, but in a pouch on their mother's back. She carries them around as they develop, until they emerge as tiny froglets.

As the eggs develop, the pouch bulges.

⑨ This frog lays its eggs on a leaf, above a pool or pond, so when the eggs hatch, the tadpoles drop straight into the water below. If the eggs are disturbed or they are threatened by a predator, the tadpoles can escape by hatching early.

The female frog lays around 40 eggs at a time.

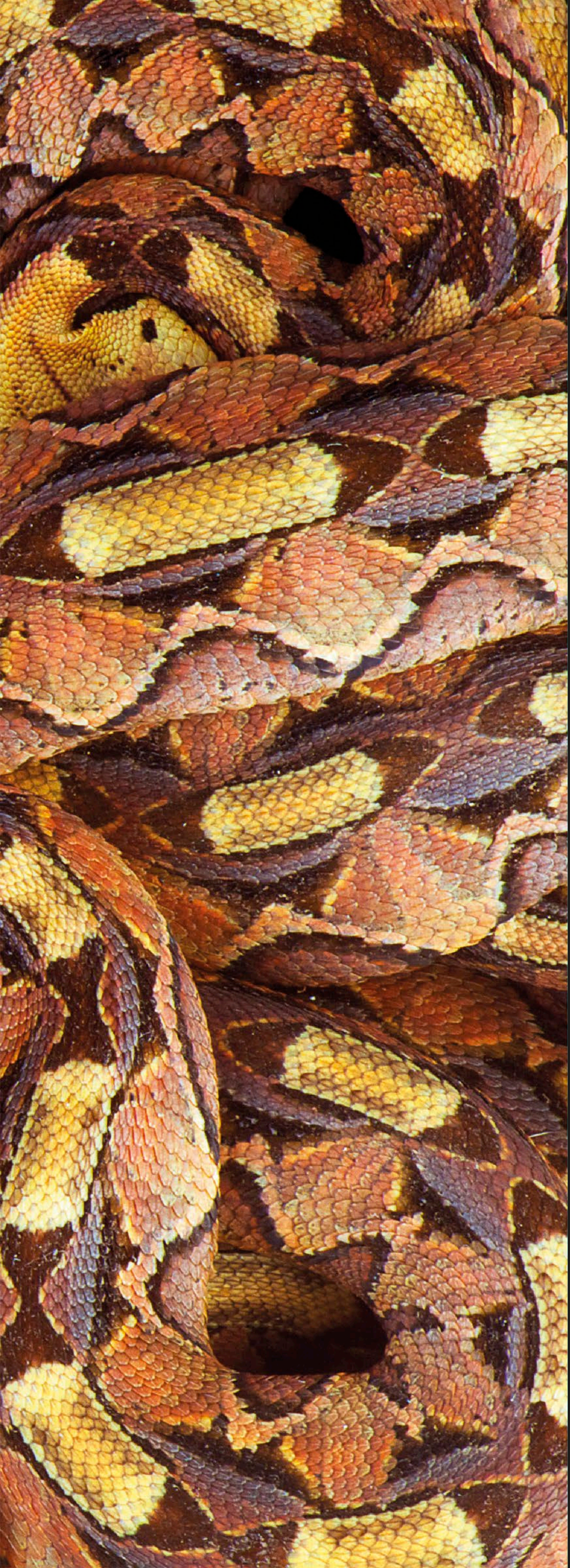


Newly hatched young

⑩ When they hatch, this slinky amphibian's young feed on the outer layer of their mother's skin. They then wait for her skin to grow back, and eat it all over again.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Red-eyed tree frog	**Common toad**	**Amboli bush frog**
African bullfrog	**Ringed caecilian**	**Eyelash marsupial frog**
Common frog	**Northern spectacled salamander**	**Strinati's cave salamander**
	Grey foam-nest tree frog	



5

REPTILES

Vipers in hiding
The patterns on the scales of these Gaboon vipers allow them to blend in with dead leaves on the rainforest floor. There are at least seven snakes in this photograph – look for their pale heads with tiny black marks on the sides to find them.

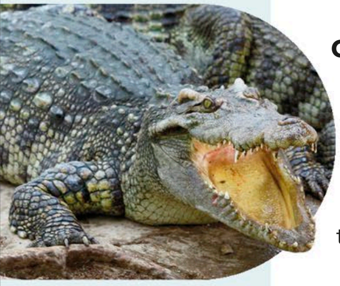
Reptiles

Cold-blooded and scaly-skinned, reptiles have existed for hundreds of millions of years – even before the dinosaurs! Most of them lay eggs to reproduce, though a few snakes and lizards give birth to live young. Reptiles are found on land and in water all over the world, except for in the very coldest places.

Types of reptiles

Lizards and snakes This is the biggest reptile group. It includes legless snakes, worm-like amphisbaenians, and lizards, which mostly have four legs.

Turtles and tortoises These reptiles have tough protective shells attached to their skeletons. Turtles live in water and tortoises on land.



Crocodilians This group includes the largest of the reptiles. They are powerful predators, with long, strong, tooth-filled jaws.

Tuataras Most members of this group lived alongside the dinosaurs. Only one species survives today, found in New Zealand.

How to hunt like a chameleon

01. Balance yourself well on a branch with the help of your unique Y-shaped feet.

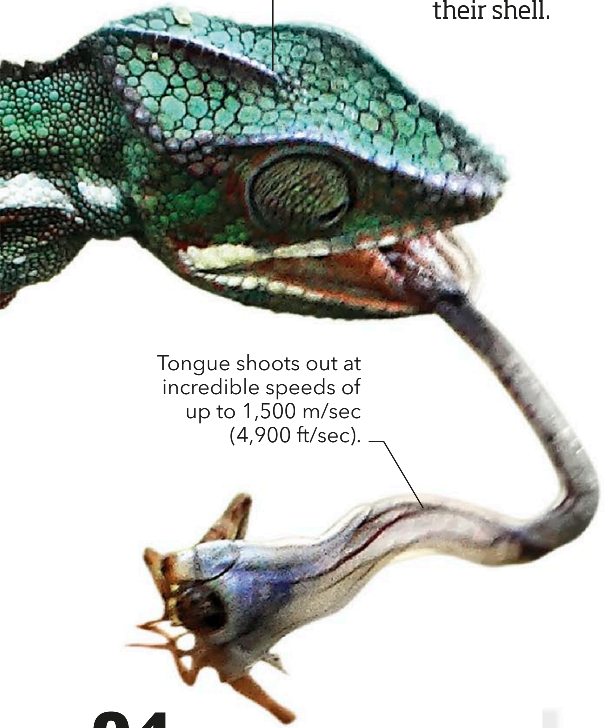
02. Stay as still as you can, looking out for tasty insects. If you need to move, do it slowly so your prey does not notice.

03. Once you have spotted something, shoot your tongue out to catch it. Your sticky saliva will help secure your prey.

A chameleon's tongue moves twice as fast as the fastest sports car.

Egg layers

Nearly all reptiles lay eggs, which hatch into miniature versions of their parents. A few, however, give birth to live young.



Head stays as still as possible, to avoid detection by prey.

Tongue shoots out at incredible speeds of up to 1,500 m/sec (4,900 ft/sec).

04. Pull your tongue back into your mouth. You will need to catch up to 20 insects every day to keep well nourished.

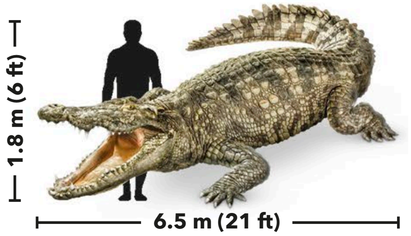
Homegrown hideaway

Tortoises are slow – running away would not get them very far. Instead, they carry a place of safety around with them at all times. If danger threatens, they retreat, hiding inside their shell.

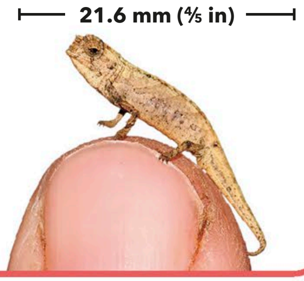
Head, legs, and tail can all be tucked safely away inside the shell.

Biggest and smallest reptiles

The largest reptile of all is the saltwater crocodile, which lives in Oceania and Asia.



The Madagascan chameleon is the tiniest reptile. It is about the size of a sunflower seed.



Basking

Reptiles are cold-blooded, which means that their body temperature changes with the temperature outside. To keep themselves warm, they sunbathe, often on top of a nice warm rock. This behaviour is called basking. To cool off they retreat into the shade.

Scales take in heat from the Sun.

In numbers

3,000
The number of teeth a crocodile grows and loses during its lifetime.

35 km/h
(22 mph) The maximum speed of a saltwater crocodile on land.

10.4 m
(34 ft) The length of the longest anaconda snake.

3 m
(10 ft) The distance a spitting cobra can propel its venom into its prey's face and eyes.

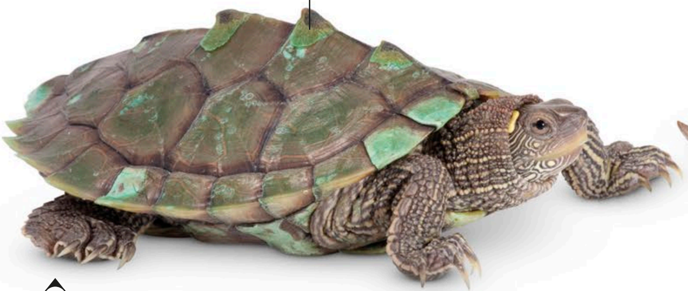
Making an escape

Some lizards can break off their tails, to distract a predator while they run away. They then grow a new tail, which takes around 60 days.

End of the tail keeps moving even after it has detached.

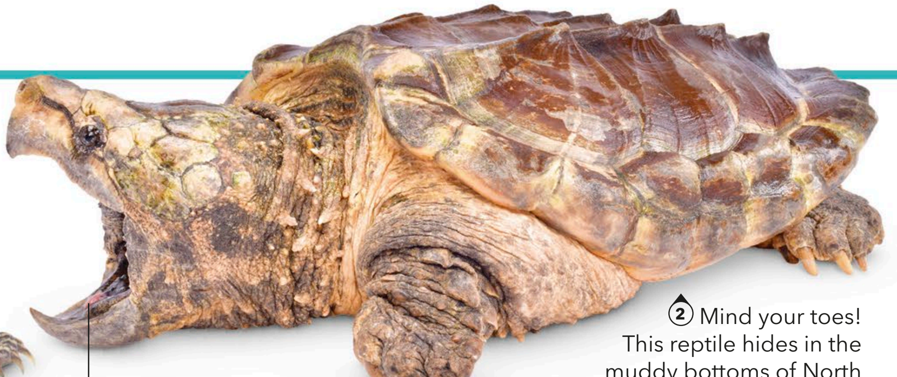
I don't believe it

Geckos can walk upside-down across ceilings – their footpads have hair-like structures that form a sticky pad and help them stick to any surface they choose.



Distinctive line of short, raised spines down the centre of the shell

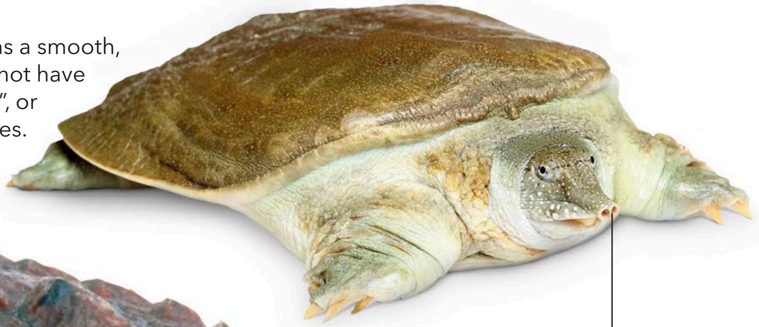
① Sometimes this animal's shell has yellow lines across it, which can join to create a messy web pattern. It enjoys sunbathing on logs high above the water's surface.



Worm-like growth lures prey inside its powerful jaws.

② Mind your toes! This reptile hides in the muddy bottoms of North American ponds or streams, waiting for prey to swim past.

③ This reptile has a smooth, leathery shell – it does not have the same hard "scutes", or bony scales of its relatives.



Tube-like nostrils let it breathe above the surface, while hiding its body under water.

TEST YOURSELF

STARTER

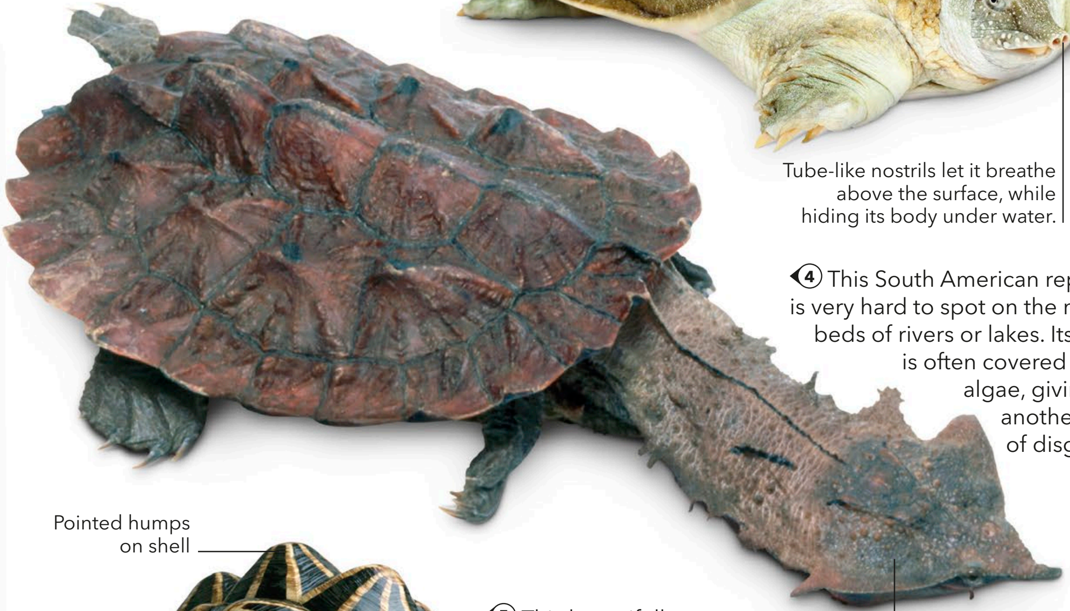
- Aldabra giant tortoise
- Green sea turtle
- Leatherback sea turtle
- Pancake tortoise

CHALLENGER

- **Alligator snapping turtle**
- **Common snake-necked turtle**
- **False map turtle**
- **Big-headed turtle**

GENIUS!

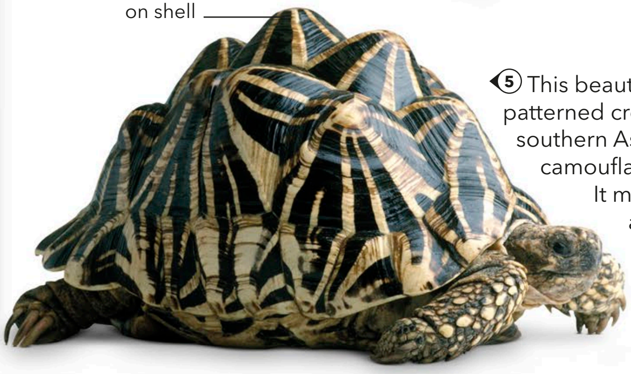
- **Chinese soft-shelled turtle**
- **Indian starred tortoise**
- **Red-eared slider**
- **Matamata**



④ This South American reptile is very hard to spot on the muddy beds of rivers or lakes. Its shell is often covered with algae, giving it another level of disguise.

Triangular head looks like leaves or bark floating in the water.

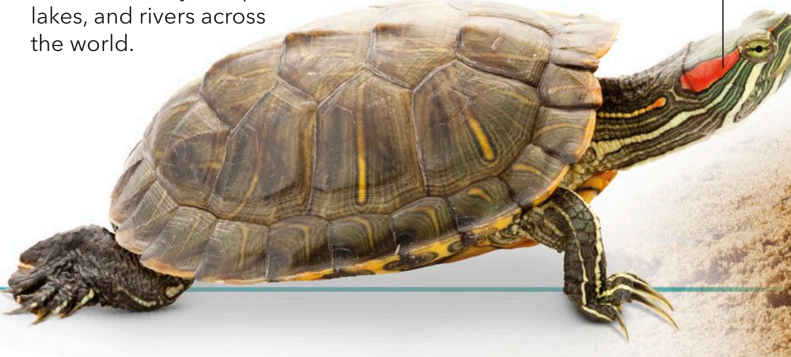
Pointed humps on shell

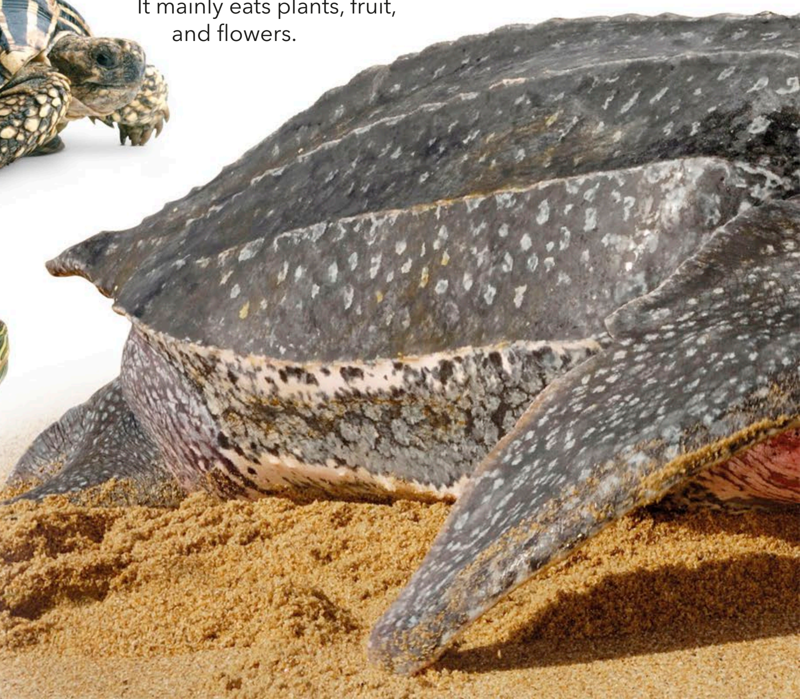


⑤ This beautifully patterned creature lives in southern Asia, where its stripes camouflage it in the dry grass. It mainly eats plants, fruit, and flowers.

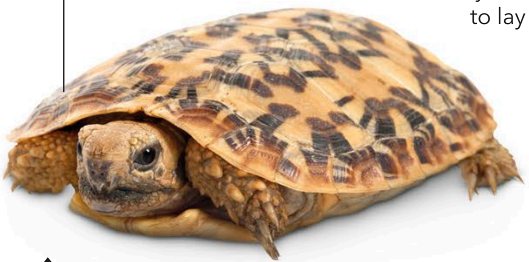
⑥ Originally from North America, this reptile is often kept as a pet. Escaped or released pets have found their way into ponds, lakes, and rivers across the world.

Red stripe behind the eye



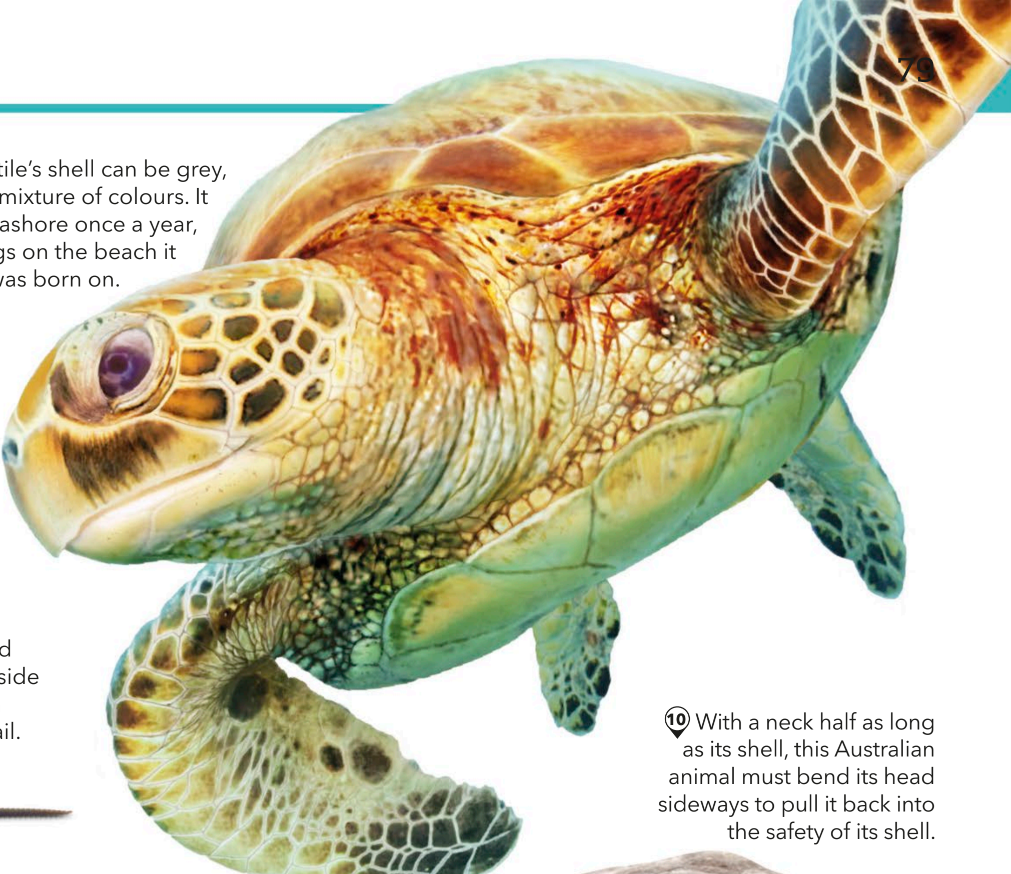


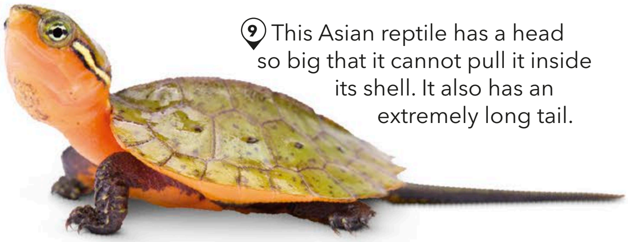
Flat, light shell allows it to move faster than most others in its family.



⑧ An unusually flat, flexible shell allows this African reptile to squeeze itself into narrow crevices to hide.

⑦ This reptile's shell can be grey, black, or a mixture of colours. It only comes ashore once a year, to lay eggs on the beach it was born on.



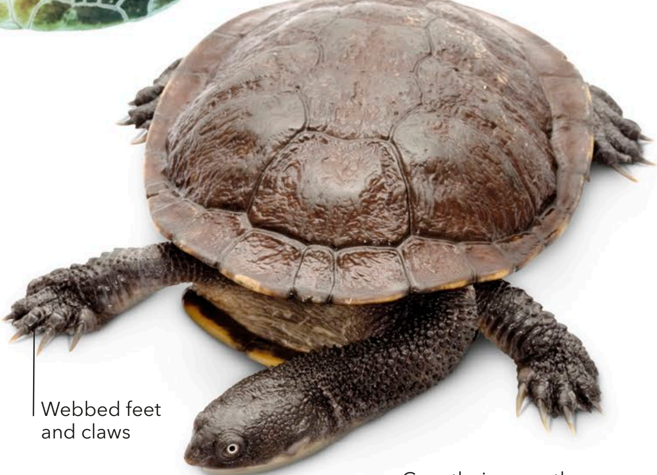


⑨ This Asian reptile has a head so big that it cannot pull it inside its shell. It also has an extremely long tail.

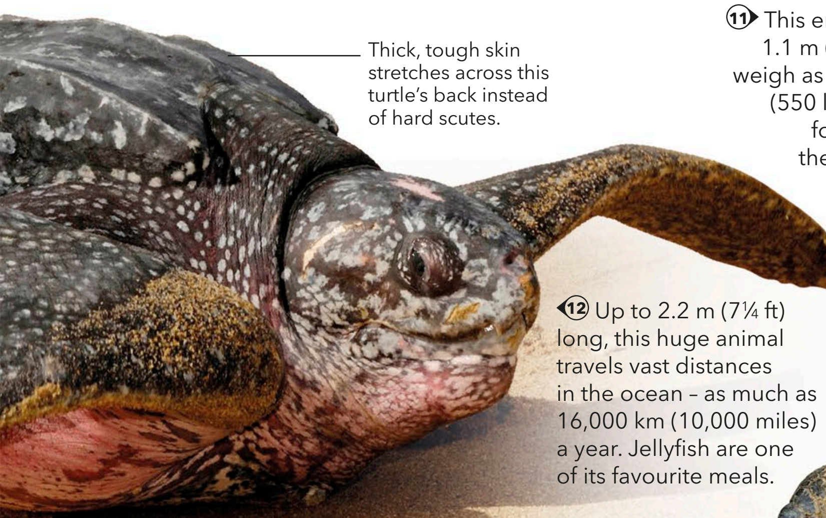
⑩ With a neck half as long as its shell, this Australian animal must bend its head sideways to pull it back into the safety of its shell.

Turtles and tortoises

These reptiles have a protective shell on their back, and they all lay eggs. Some turtles stay in water for almost their entire lives – they only visit land to lay their eggs. Can you tell a land-living tortoise from a water-loving turtle?



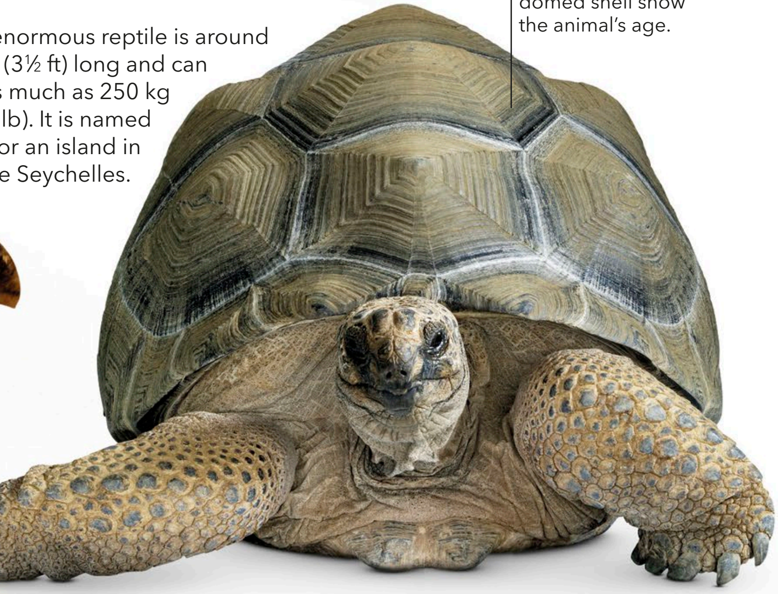
Webbed feet and claws



Thick, tough skin stretches across this turtle's back instead of hard scutes.

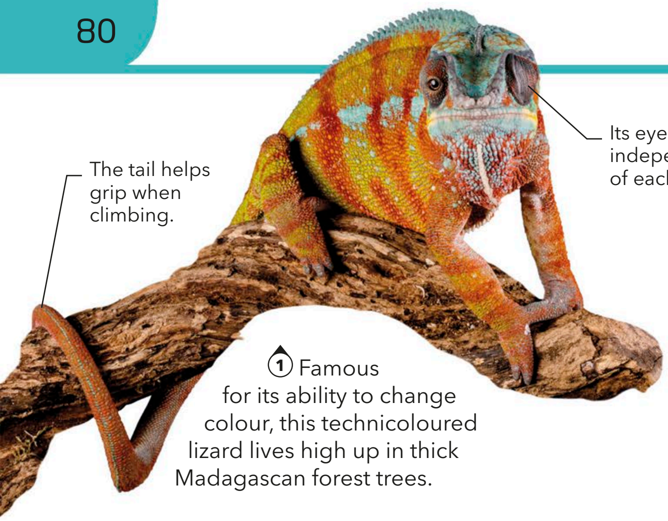
⑫ Up to 2.2 m (7¼ ft) long, this huge animal travels vast distances in the ocean – as much as 16,000 km (10,000 miles) a year. Jellyfish are one of its favourite meals.

⑪ This enormous reptile is around 1.1 m (3½ ft) long and can weigh as much as 250 kg (550 lb). It is named for an island in the Seychelles.



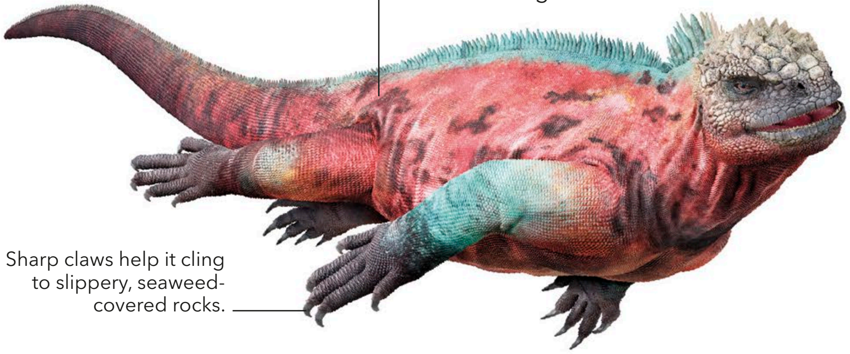
Growth rings on the domed shell show the animal's age.

ANSWERS: 1. False map turtle 2. Alligator snapping turtle 3. Chinese soft-shelled turtle 4. Matamata 5. Indian starred tortoise 6. Red-eared slider 7. Green sea turtle 8. Pancake tortoise 9. Big-headed turtle 10. Common snake-necked turtle 11. Aldabra giant tortoise 12. Leatherback sea turtle


The tail helps grip when climbing.
Its eyes can rotate independently of each other.

① Famous for its ability to change colour, this technicoloured lizard lives high up in thick Madagascan forest trees.

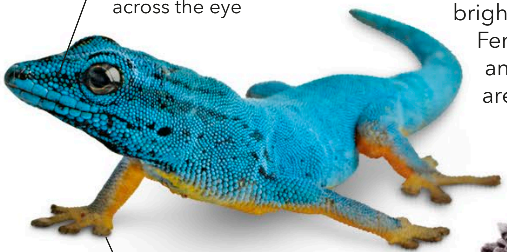
② This lizard lives on rocky shores of the Galápagos Islands, where it feeds on seaweeds. Some even dive down to graze at the bottom of the sea.

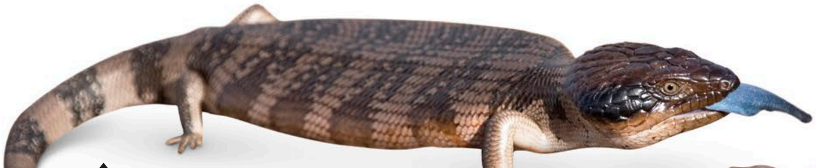

Males become more colourful during the breeding season.
Sharp claws help it cling to slippery, seaweed-covered rocks.

Lots of lizards

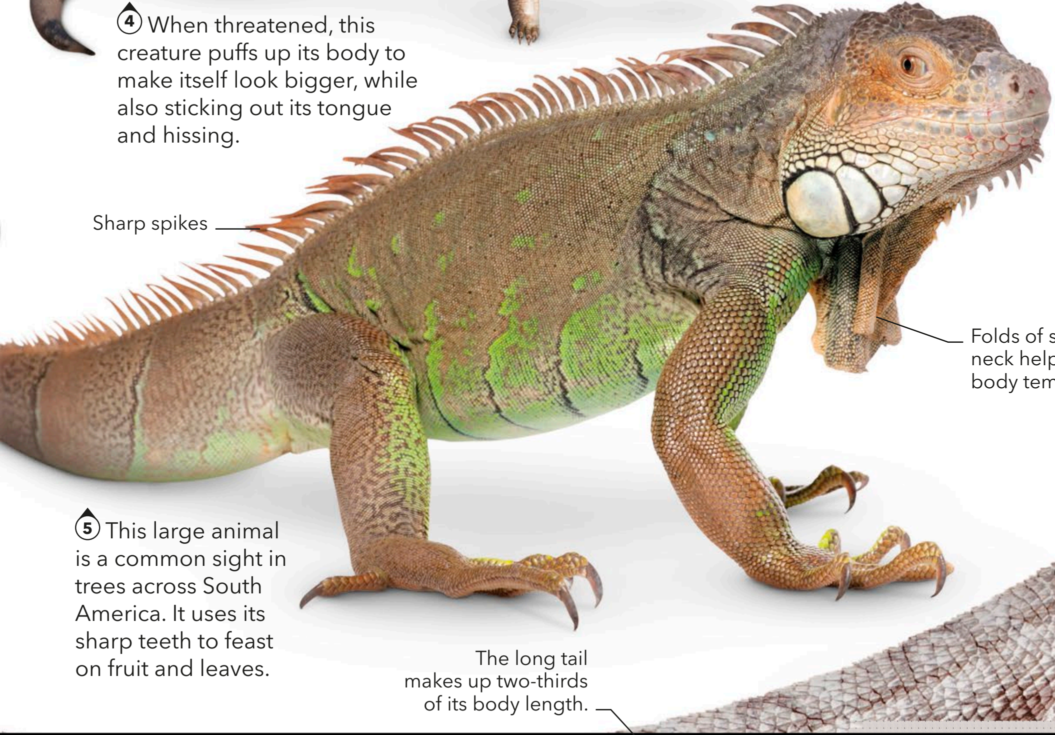
Forming the biggest group of reptiles, with more than 5,500 species, lizards come in all shapes and sizes – from tiny geckos to the 3-m (10-ft) long Komodo dragon. These scaly, cold-blooded animals are found on every continent except Antarctica.

③ Only the strongest males of this small species are bright blue in colour. Females, the young, and weaker males are green or brown.


Black stripe across the eye
Sticky pads under its toes cling to smooth surfaces.

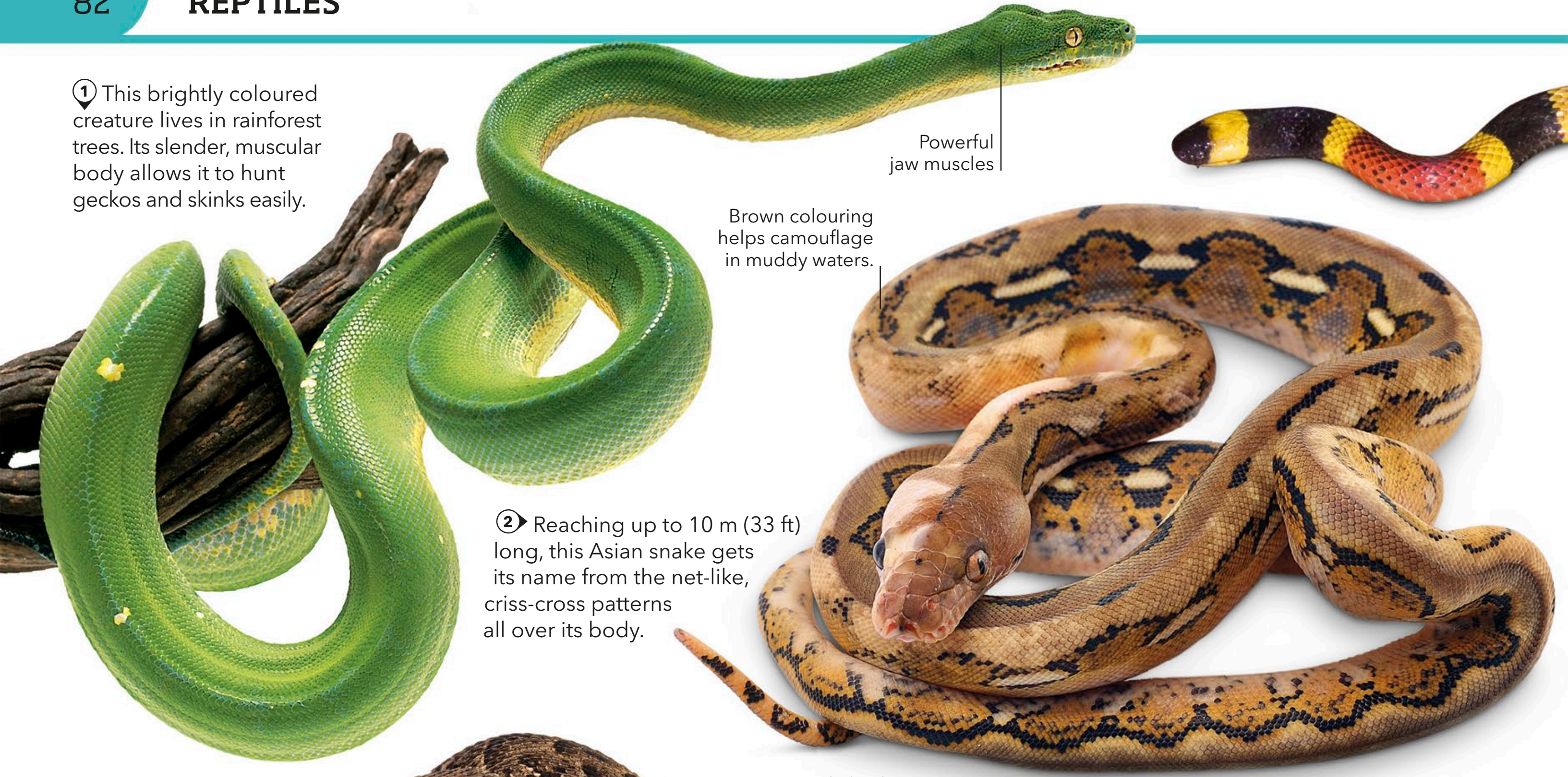


④ When threatened, this creature puffs up its body to make itself look bigger, while also sticking out its tongue and hissing.


Sharp spikes
Folds of skin on the neck help regulate body temperature.
The long tail makes up two-thirds of its body length.

⑤ This large animal is a common sight in trees across South America. It uses its sharp teeth to feast on fruit and leaves.

ANSWERS: 1. Panther chameleon 2. Marine iguana 3. Turquoise dwarf gecko 4. Blue-tongued skink 5. Green iguana 6. Komodo dragon 7. Fire skink 8. Gila monster 9. Madagascar day gecko 10. Thorny devil 11. Green anole 12. Frilled lizard

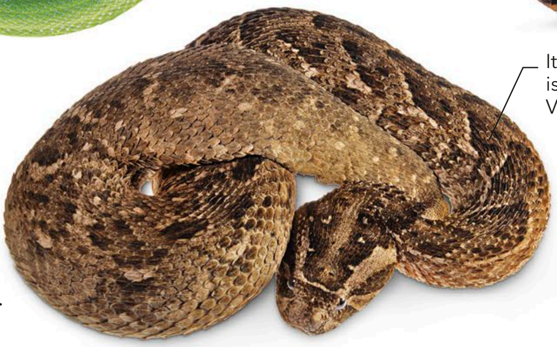


① This brightly coloured creature lives in rainforest trees. Its slender, muscular body allows it to hunt geckos and skinks easily.

Powerful jaw muscles

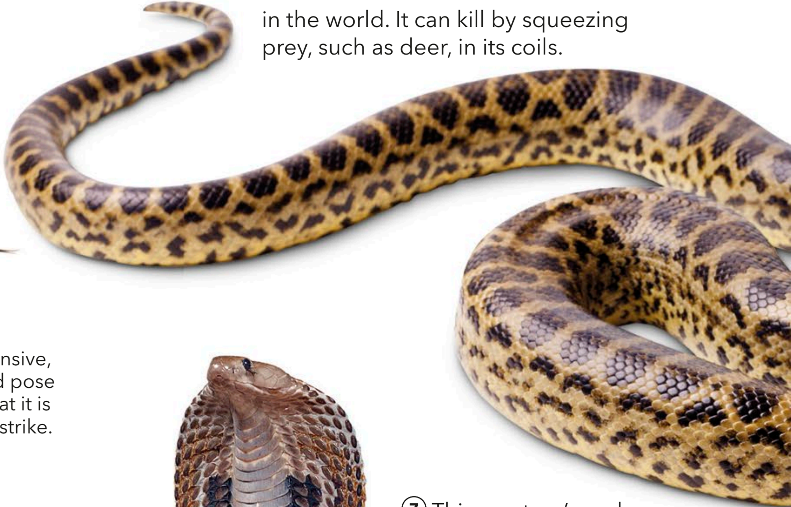
Brown colouring helps camouflage in muddy waters.

② Reaching up to 10 m (33 ft) long, this Asian snake gets its name from the net-like, criss-cross patterns all over its body.

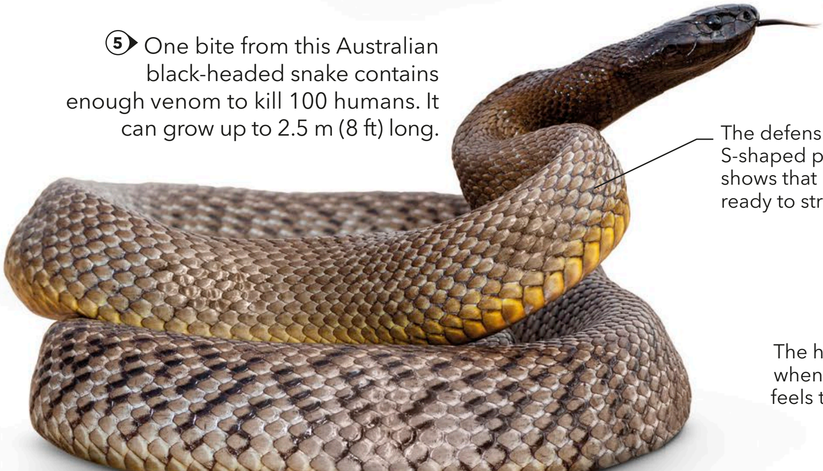


Its wide body is covered with V-shaped markings.

③ This venomous snake lives all over Africa. When threatened, it puffs up its body and makes a loud hissing noise.

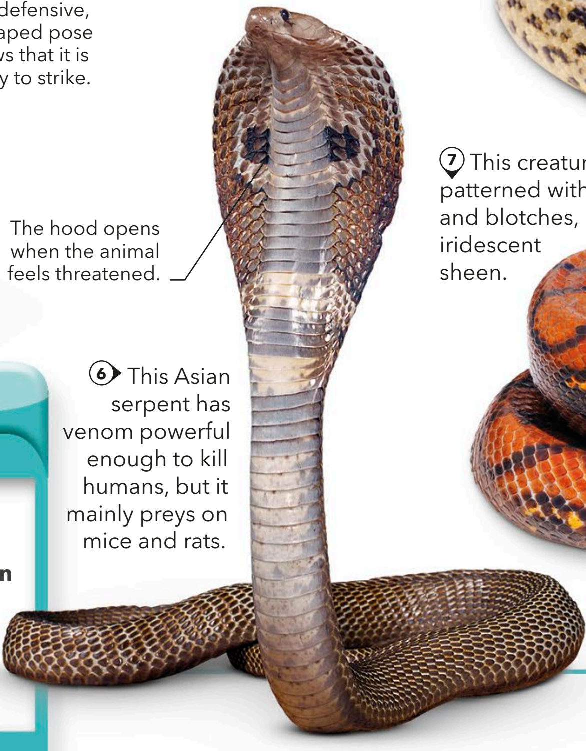


④ At more than 70 kg (150 lb), this South American snake is the heaviest in the world. It can kill by squeezing prey, such as deer, in its coils.



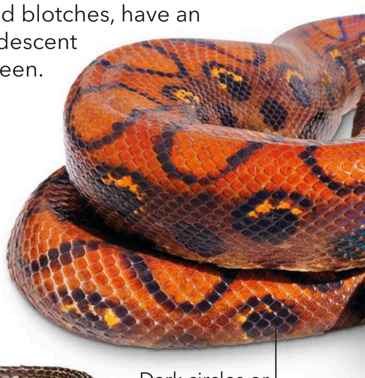
⑤ One bite from this Australian black-headed snake contains enough venom to kill 100 humans. It can grow up to 2.5 m (8 ft) long.

The defensive, S-shaped pose shows that it is ready to strike.



The hood opens when the animal feels threatened.

⑥ This Asian serpent has venom powerful enough to kill humans, but it mainly preys on mice and rats.

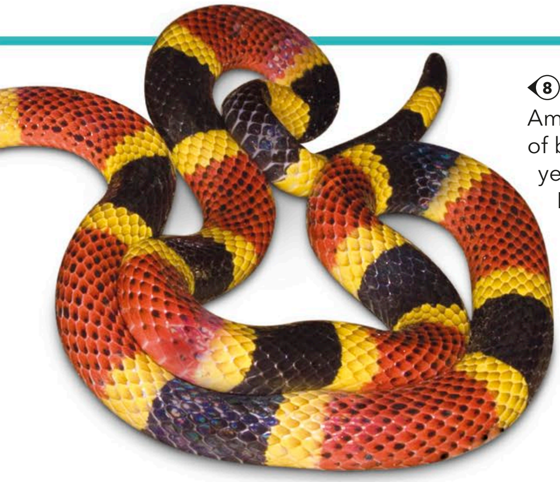


⑦ This creature's scales, patterned with black rings and blotches, have an iridescent sheen.

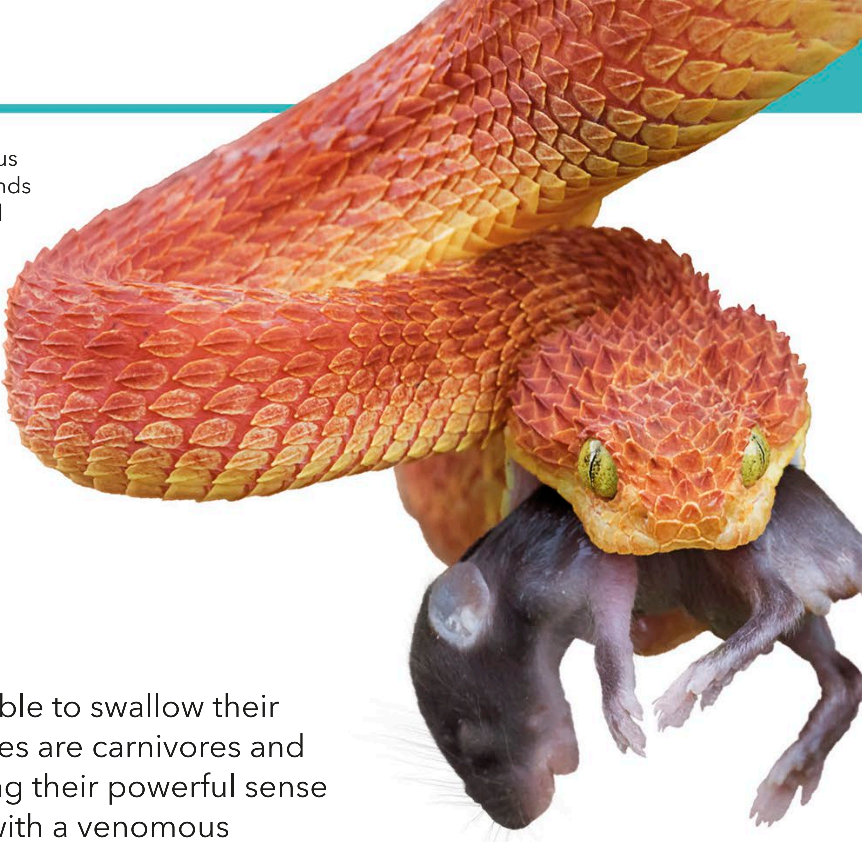
Dark circles or "eyespots" on the back

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Indian cobra	**Western diamond-backed rattlesnake**	**Bush viper**
Yellow-lipped sea krait	**Giant anaconda**	**Inland taipan**
Vine snake	**Rainbow boa**	**Green tree python**
Puff adder	**Central American coral snake**	**Reticulated python**



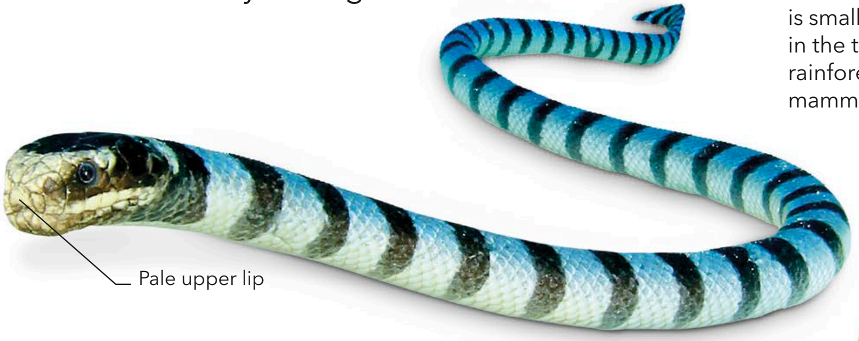
⑧ This highly venomous American snake has bands of bright red, black, and yellow across its body. Its blunt head is black and looks similar to its tail.



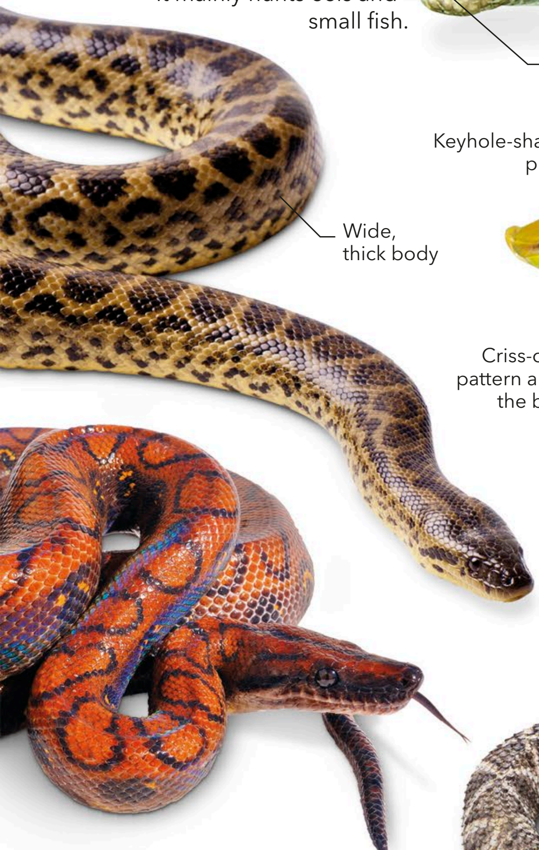
⑨ This snake with reddish scales is small but venomous and is found in the thick undergrowth of African rainforests. It hunts for small mammals, birds, frogs, and reptiles.

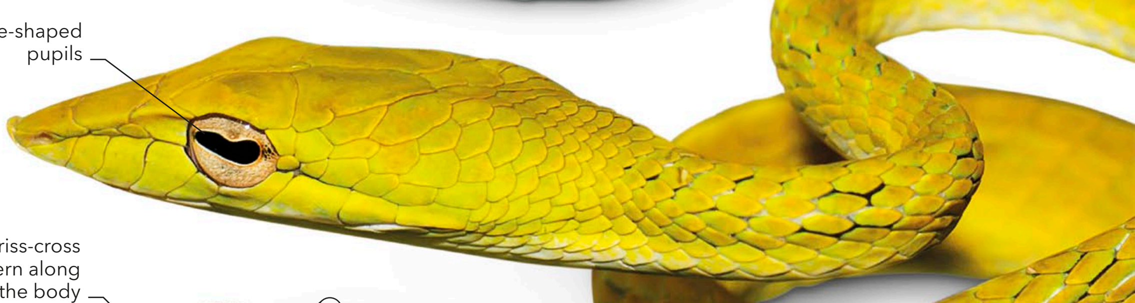
Ssssnakes

These slithery creatures have no legs and are able to swallow their prey whole, without any need to chew. All snakes are carnivores and hunt other animals, from insects to rabbits, using their powerful sense of smell to sniff them out. Some kill their prey with a venomous bite, while others squeeze it to death by coiling their body around it.

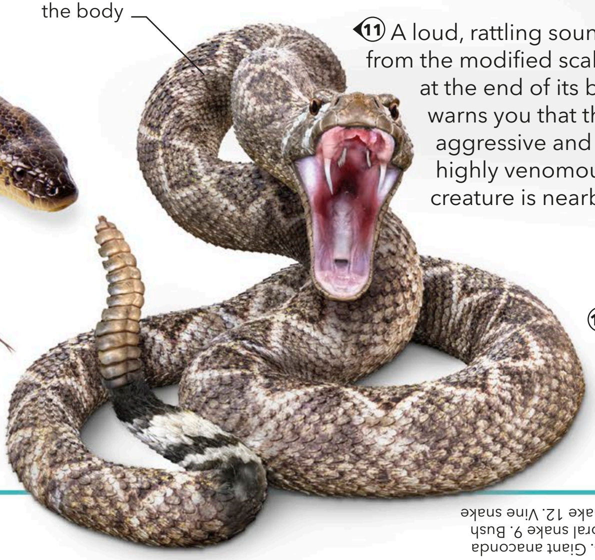


⑩ With a paddle-like tail, this ocean dweller is well adapted for swimming. It mainly hunts eels and small fish.





⑫ Coiled around a tree in the rainforests of South America, this slender serpent can look similar to a plant. It ambushes its prey and kills with one bite!

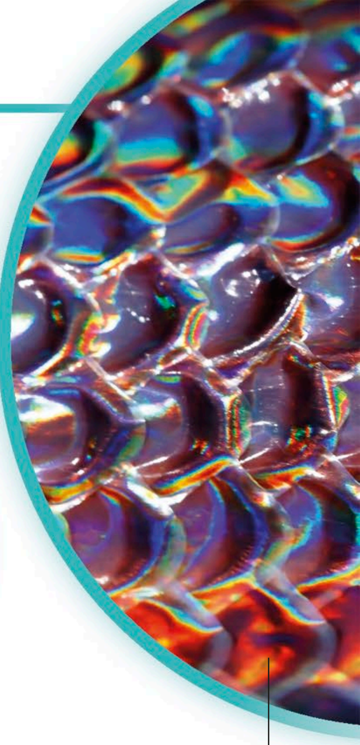


⑪ A loud, rattling sound from the modified scales at the end of its body warns you that this aggressive and highly venomous creature is nearby.

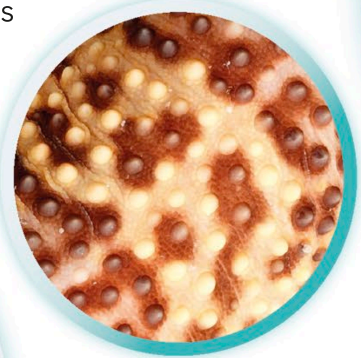
ANSWERS: 1. Green tree python 2. Reticulated python 3. Puff adder 4. Giant anaconda 5. Inland taipan 6. Indian cobra 7. Rainbow boa 8. Central American coral snake 9. Bush viper 10. Yellow-lipped sea krait 11. Western diamond-backed rattlesnake 12. Vine snake

Scaly stories

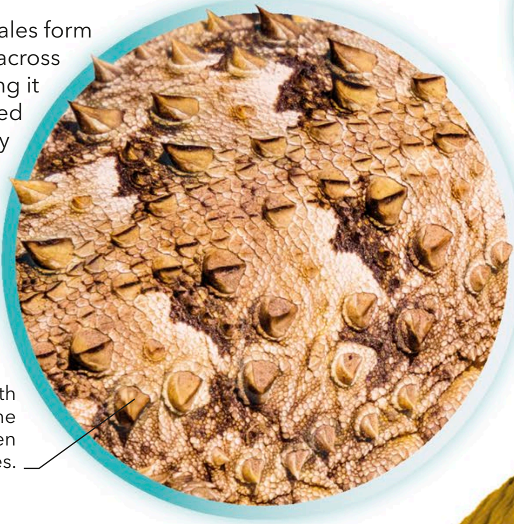
Reptiles have tough, waterproof skin that stops moisture from escaping, enabling them to live in dry places. On top of the skin is a layer of small, hard plates called scales, which protects the skin from damage and parasites. Scales come in a huge variety of shapes, sizes, and colours.



The scales look smooth and polished.

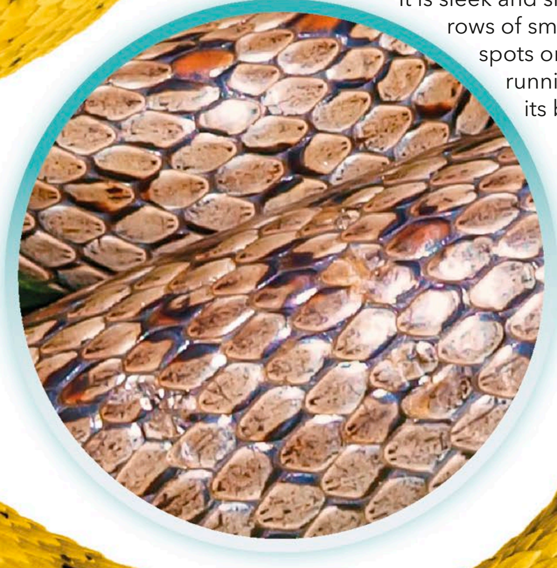


② Small, evenly sized scales cover the body of this small lizard. These are covered with markings that look like the spots on a big cat's fur.

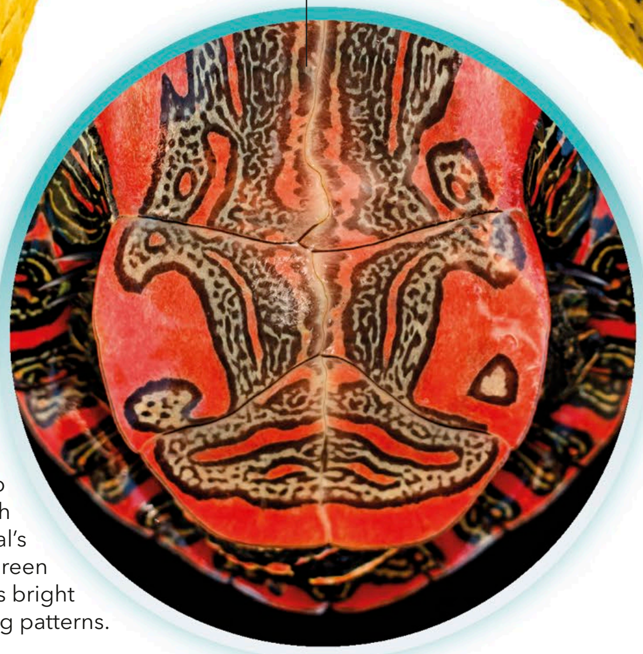


① Modified scales form tiny horn-like spines across this lizard's body, making it rough and spiky. Combined with brown blotches, they camouflage it well. When threatened, it puffs up its spiny body.

Small, smooth scales fill the spaces between the spines.



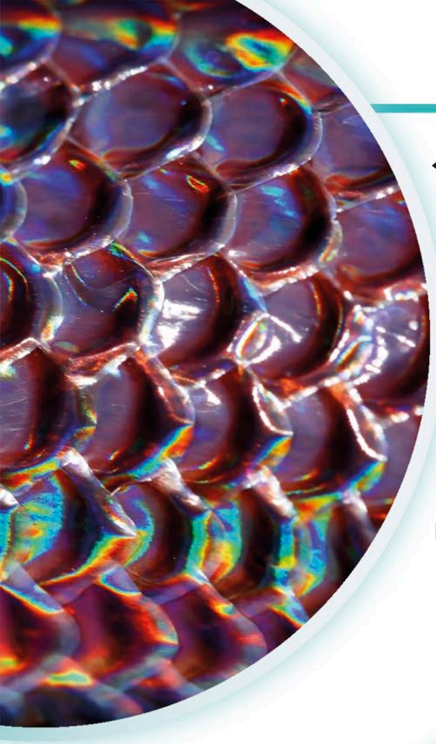
③ Even, flat, and polished scales protect the skin of this slithering reptile. It is sleek and slender, with rows of small, dark spots or blotches running down its back.



The pattern on each animal's shell is unique.

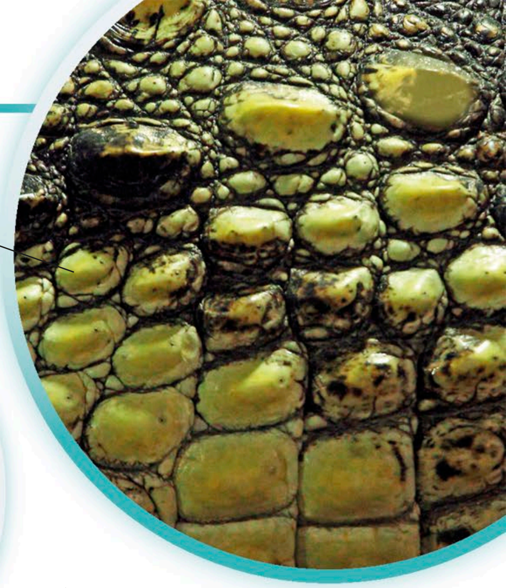
④ The top of this North American animal's shell is plain dark green while the underside is bright red with artistic, swirling patterns.

ANSWERS: 1. Coast horned lizard 2. Leopard gecko 3. Smooth snake 4. Painted turtle 5. Sunbeam snake 6. Radiated tortoise 7. Mugger crocodile 8. Jewelled chameleon 9. Mojave rattlesnake 10. Eyelash viper 11. Spiny bush viper



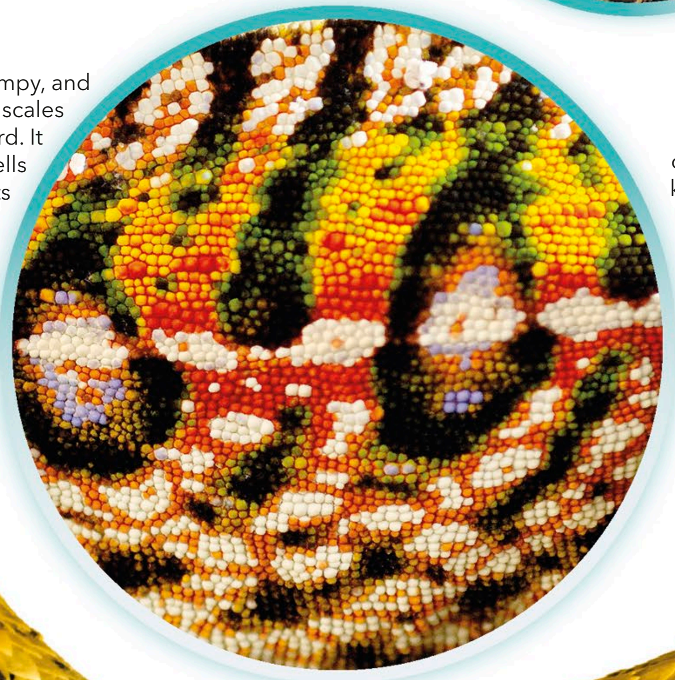
⑤ In low light, this snake looks brown or black. When the light bounces off of it, however, its scales glimmer with rainbow colours.

⑥ Bony plates called scutes fuse together to form a hard shell on the back of this African reptile. Each scute is marked with a star-like pattern.



Skin is covered by tough, waterproof scales

⑦ This freshwater predator's body is covered with bony plates that act as protective armour. Its underside is covered with scales that are smoother and smaller, and more uniform in pattern, than those on its back and tail.



⑧ Small, bumpy, and unevenly sized scales cover this lizard. It has special cells underneath its skin that allow it to change colour when it is excited or needs to hide.

⑨ At the tip of this creature's tail is a ring of hollow scales that knock against each other to make a rattling sound as a warning not to come any closer!

Black spots all over its body

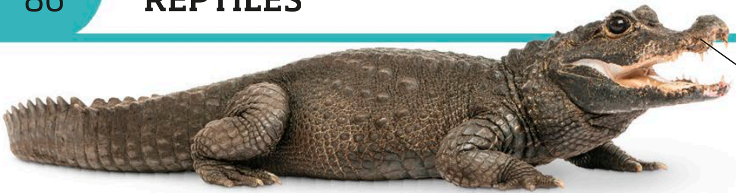
⑩ Tough, pointed scales stop this snake's skin from getting scratched by tree branches. It is named for the spiky, raised scales above its eyes.

Each scale has a ridge down its centre.

⑪ Pointed, leaf-shaped scales give this African snake a bristly, spiky look. It slithers through the undergrowth hunting for frogs, birds, and mice.

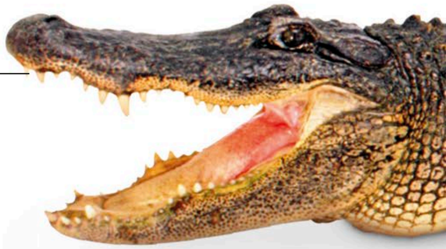
TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Mugger crocodile	**Sunbeam snake**	**Coast horned lizard**
Jewelled chameleon	**Smooth snake**	**Painted turtle**
Mojave rattlesnake	**Radiated tortoise**	**Spiny bush viper**
Leopard gecko	**Eyelash viper**	

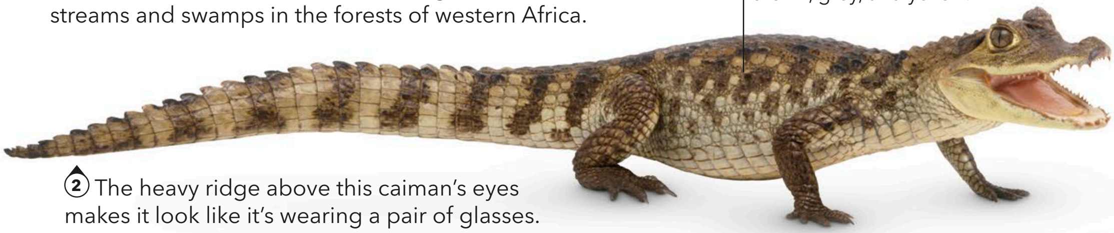


Short, blunt snout

① This is the smallest crocodile species – the biggest adults reach around 1.2 m (4 ft) in length. It lives in streams and swamps in the forests of western Africa.

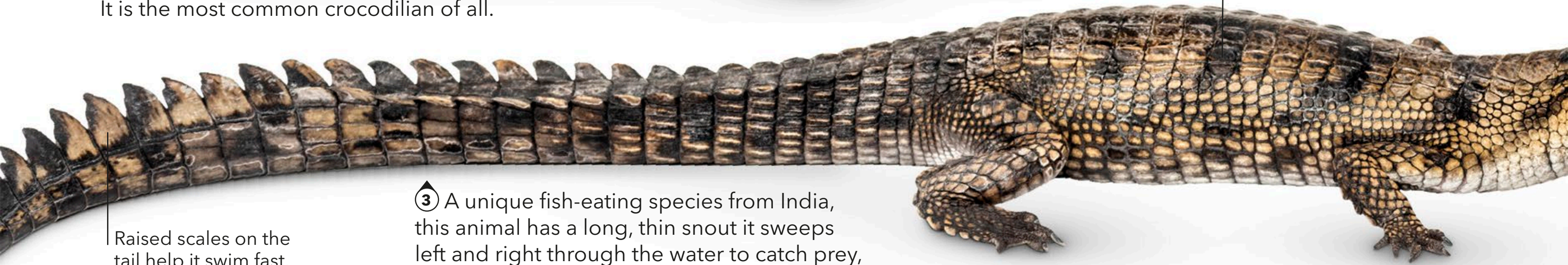


Teeth are constantly replaced as they wear out.



Skin is a mixture of brown, grey, and yellow.

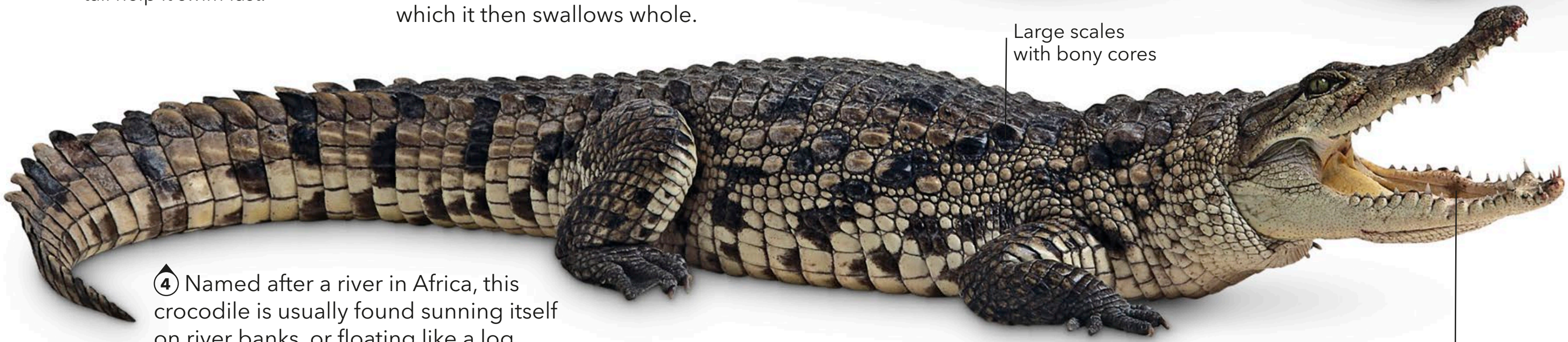
② The heavy ridge above this caiman's eyes makes it look like it's wearing a pair of glasses. It is the most common crocodilian of all.



Grey or olive skin

Raised scales on the tail help it swim fast.

③ A unique fish-eating species from India, this animal has a long, thin snout it sweeps left and right through the water to catch prey, which it then swallows whole.



Large scales with bony cores

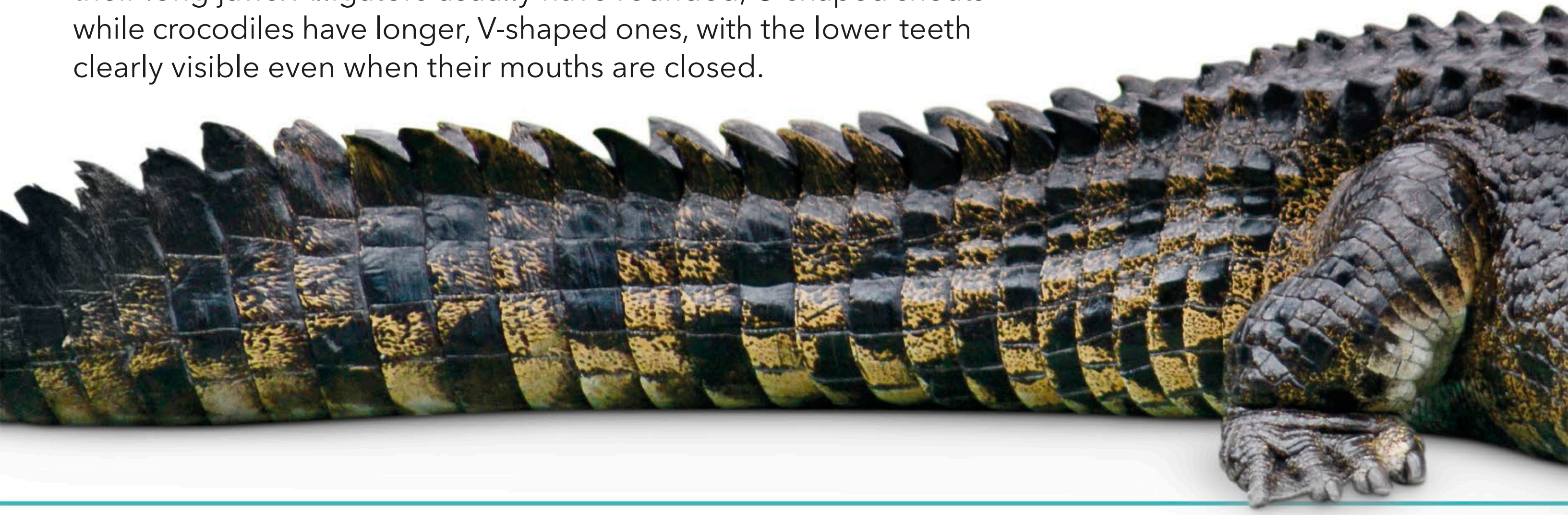
④ Named after a river in Africa, this crocodile is usually found sunning itself on river banks, or floating like a log.

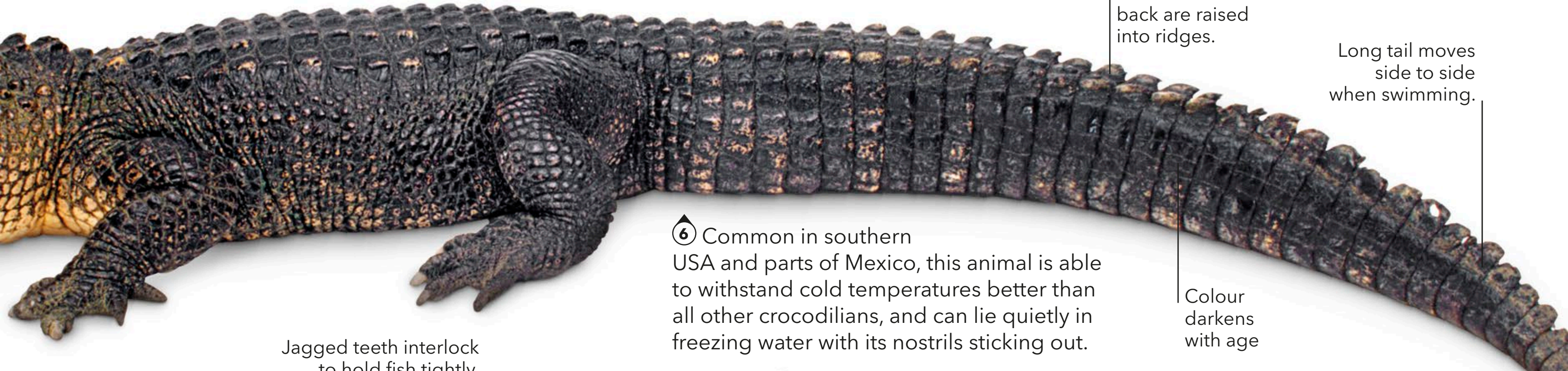
Mouth is often held open to lose heat on hot days.

Make it snappy

Crocodiles, alligators, and their close relatives form a group called the crocodilians – powerful predators, with rows of sharp teeth in their long jaws. Alligators usually have rounded, U-shaped snouts while crocodiles have longer, V-shaped ones, with the lower teeth clearly visible even when their mouths are closed.

⑤ This is the world's biggest reptile – up to 6 m (20 ft) long. It is the only crocodilian frequently seen out at sea and is a fearsome predator, attacking any animal it can catch.



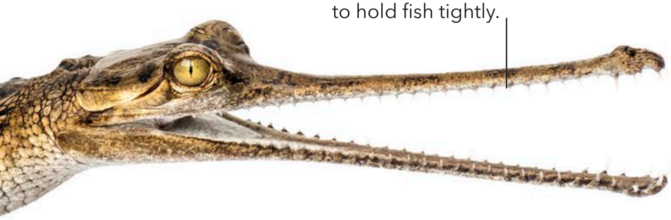


Scales on the back are raised into ridges.

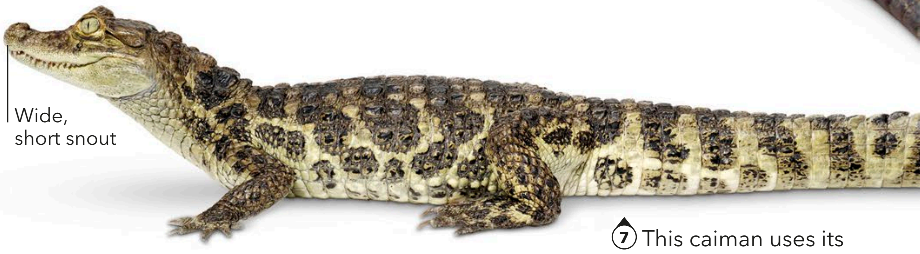
Long tail moves side to side when swimming.

⑥ Common in southern USA and parts of Mexico, this animal is able to withstand cold temperatures better than all other crocodilians, and can lie quietly in freezing water with its nostrils sticking out.

Colour darkens with age

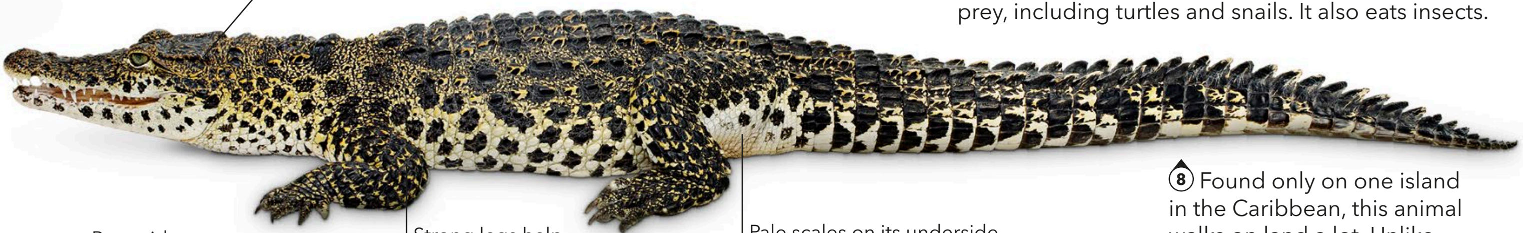


Jagged teeth interlock to hold fish tightly.



Wide, short snout

⑦ This caiman uses its small, powerful jaws to crush the shells of its larger prey, including turtles and snails. It also eats insects.

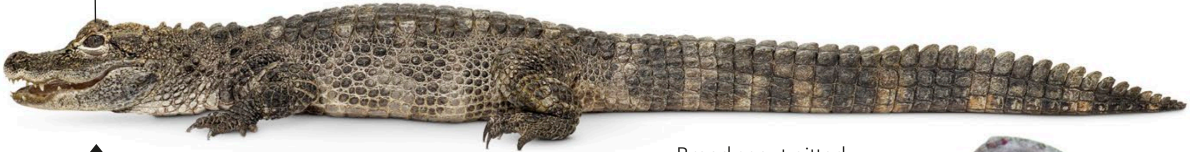


External ear flap closes when underwater.

Strong legs help it race across short distances.

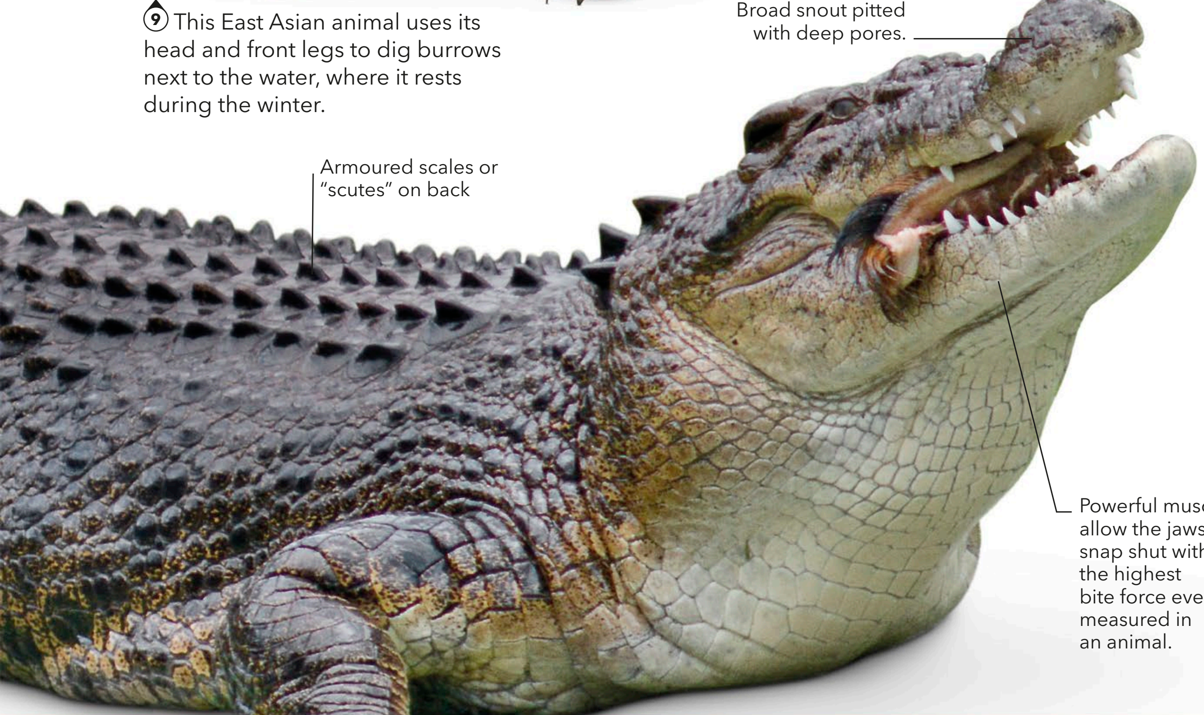
Pale scales on its underside are small and uniform in size and pattern.

⑧ Found only on one island in the Caribbean, this animal walks on land a lot. Unlike most other crocodilians, its toes are not webbed.



Bony ridges on upper eyelids

⑨ This East Asian animal uses its head and front legs to dig burrows next to the water, where it rests during the winter.



Broad snout pitted with deep pores.

Armoured scales or "scutes" on back

Powerful muscles allow the jaws to snap shut with the highest bite force ever measured in an animal.

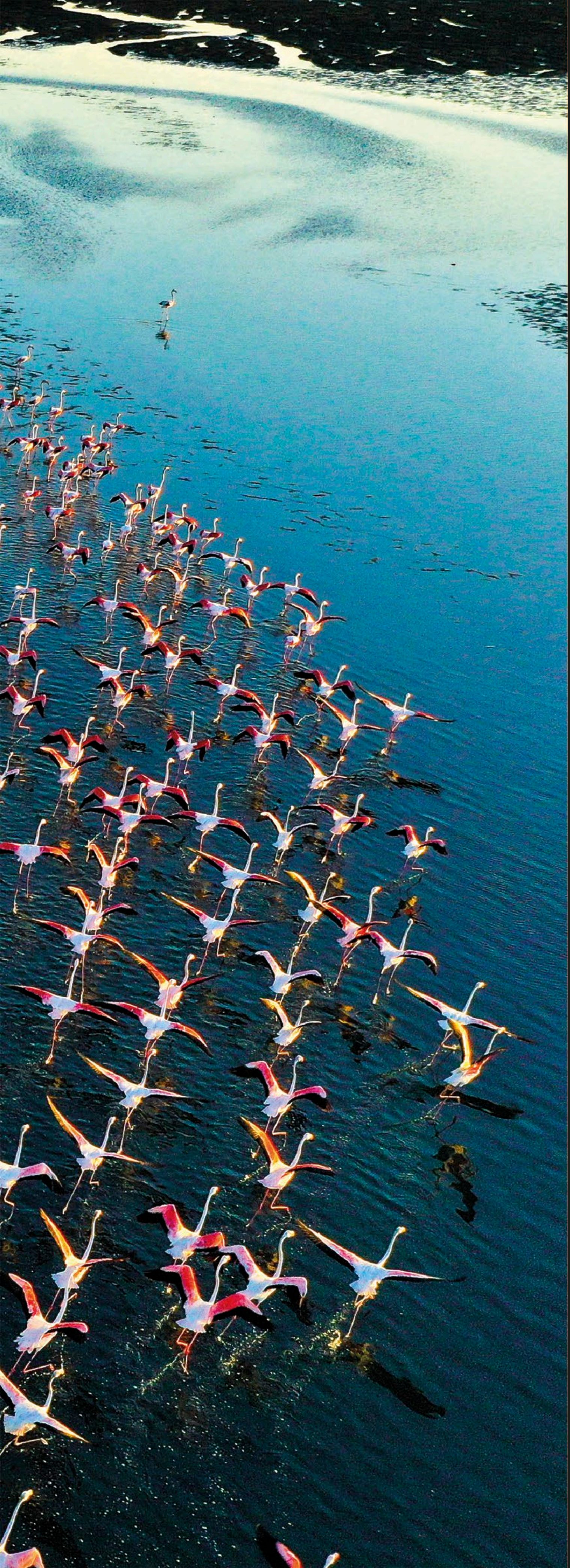
TEST YOURSELF

STARTER
- American alligator
- Saltwater crocodile
- Dwarf crocodile

CHALLENGER
- **Gharial**
- **Nile crocodile**
- **Spectacled caiman**

GENIUS!
- **Broad-snouted caiman**
- **Cuban crocodile**
- **Chinese alligator**

ANSWERS: 1. Dwarf crocodile 2. Spectacled caiman 3. Gharial 4. Nile crocodile 5. Saltwater crocodile 6. American alligator 7. Broad-snouted caiman 8. Cuban crocodile 9. Chinese alligator



6 BIRDS

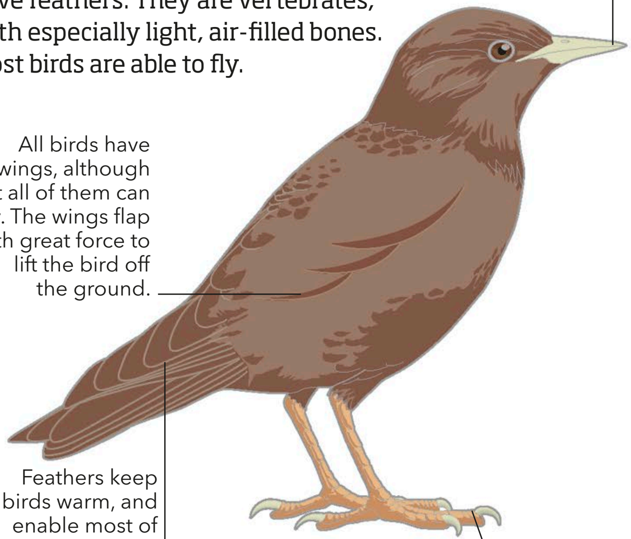
Flamingo flock
Many birds live alone for much of the year, while others prefer to live in pairs or small groups. Some gather in flocks, like these flamingos, which may also form huge breeding colonies of more than one million birds. This protects them from predators that could steal their eggs and chicks.

Birds

Looking at birds today, it may be hard to believe that they are related to dinosaurs. The earliest birds emerged around 150 million years ago, and today there are more than 10,000 species across 28 different major groups. They vary from tiny hummingbirds, which can be as small as a bee, to ostriches that are 3 m (10 ft) tall.

What is a bird?

Birds are warm blooded, lay eggs, and have feathers. They are vertebrates, with especially light, air-filled bones. Most birds are able to fly.


Beak for catching and holding food.
All birds have wings, although not all of them can fly. The wings flap with great force to lift the bird off the ground.
Feathers keep birds warm, and enable most of them to fly.
Bird claws and feet vary, depending on their lifestyle.

Types of birds

Perching birds
More than half of all bird species are in this group, also called the passerines. They have sharp-clawed feet that are adapted for perching.

Non-perching birds
This group is divided into many smaller ones, covering a huge range of birds. They include owls, parrots, birds of prey, penguins, and flamingos.

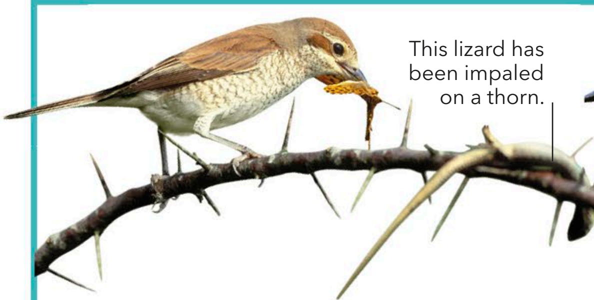
Red-crowned cranes often stay with one partner for their whole lives.

How to court like a crane

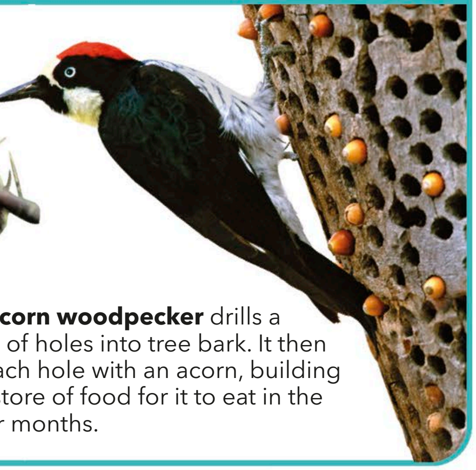
01. Choose your partner carefully so your courtship dance is both graceful and in perfect time.

02. Move towards your partner, spreading your wings and leaping gracefully.

Storing food


This lizard has been impaled on a thorn.

The red-backed shrike hunts small animals, including insects, lizards, and mice. It stores food for later by impaling its catch on thorny branches.



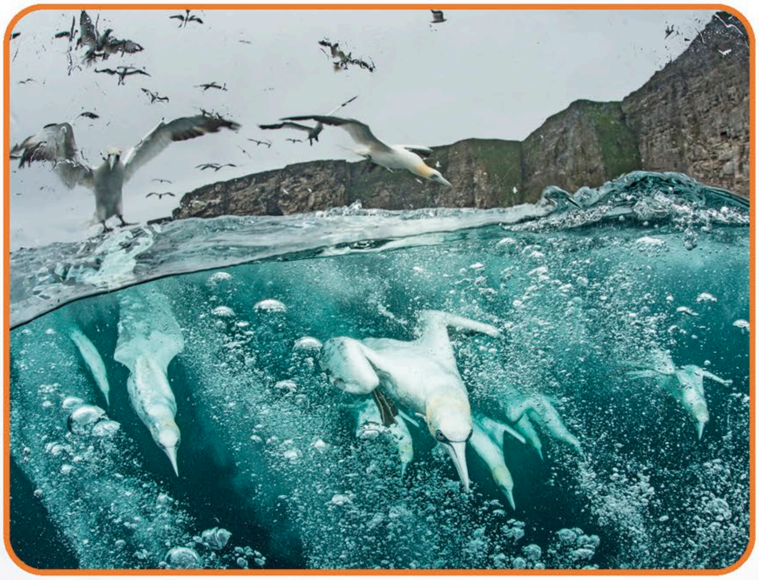
The acorn woodpecker drills a series of holes into tree bark. It then fills each hole with an acorn, building up a store of food for it to eat in the winter months.

In numbers

1,000 km
(620 miles) The distance that a wandering albatross can fly in a single day.

6,000
The number of nests in a single tree built by one red-billed quelea colony.

565 m
(1,854 ft) The maximum depth an emperor penguin can dive to.



Seabirds

Some birds, such as these gannets, spend most of their time at sea. They only visit land to raise their young. Gannets are experts at fishing and can reach depths of up to 30 m (98 ft) to catch prey.

I don't believe it!

Owls can't chew, so they swallow small prey, such as mice, whole. They then cough up pellets of undigested body parts including fur and bones.

03. Once close to your partner, tip your head back and call loudly to each other.

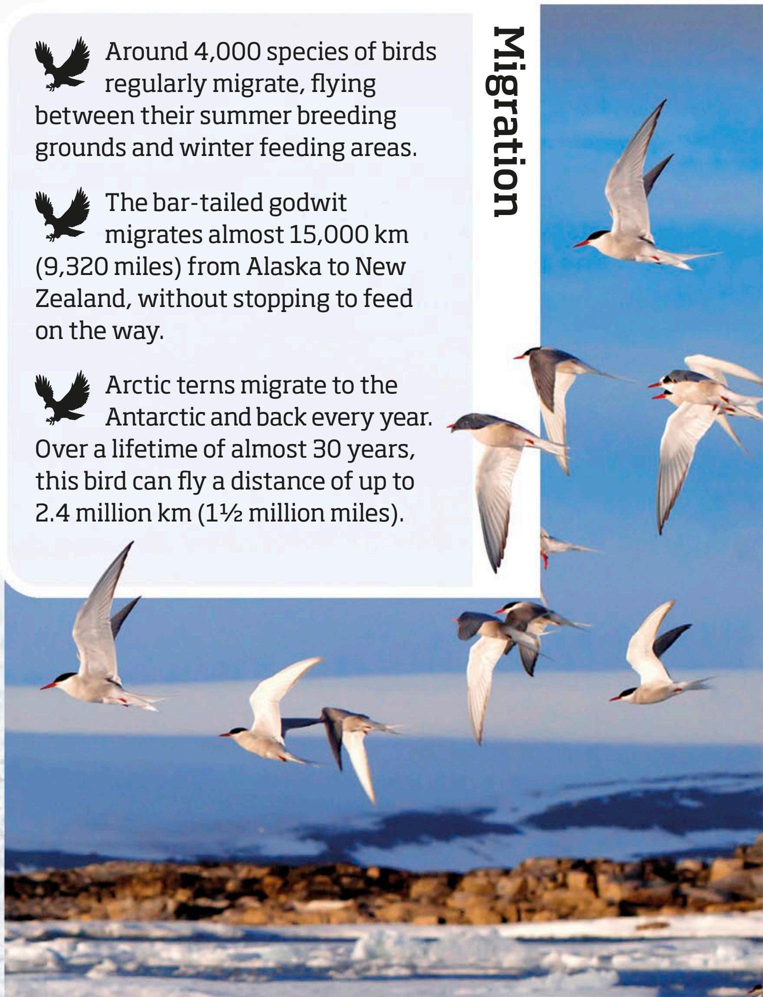
Sneaky bird

Cuckoos lay their eggs in other birds' nests. Once hatched, the cuckoo chick pushes any other eggs out, and is fed by the other chicks' parents.

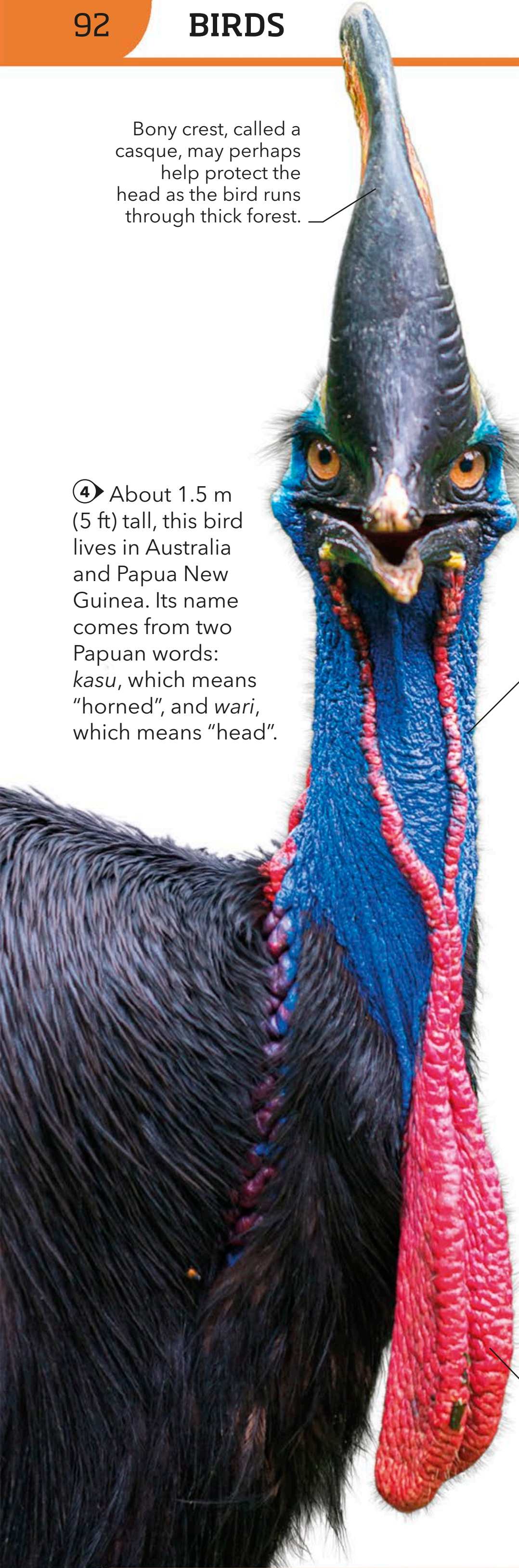
04. Bow to each other and then dance around your partner, and bounce up and down together.

05. Remember the dance routine – you may perform it many times together to demonstrate your strong bond.

Migration



- Around 4,000 species of birds regularly migrate, flying between their summer breeding grounds and winter feeding areas.
- The bar-tailed godwit migrates almost 15,000 km (9,320 miles) from Alaska to New Zealand, without stopping to feed on the way.
- Arctic terns migrate to the Antarctic and back every year. Over a lifetime of almost 30 years, this bird can fly a distance of up to 2.4 million km (1½ million miles).

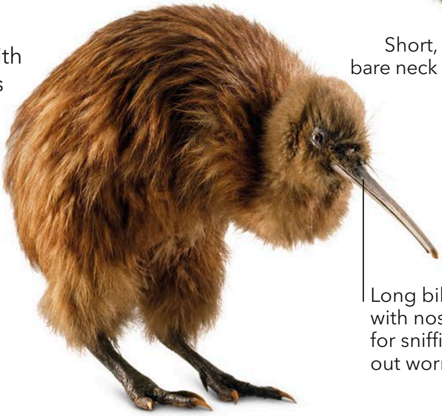


Bony crest, called a casque, may perhaps help protect the head as the bird runs through thick forest.

④ About 1.5 m (5 ft) tall, this bird lives in Australia and Papua New Guinea. Its name comes from two Papuan words: *kasu*, which means "horned", and *wari*, which means "head".

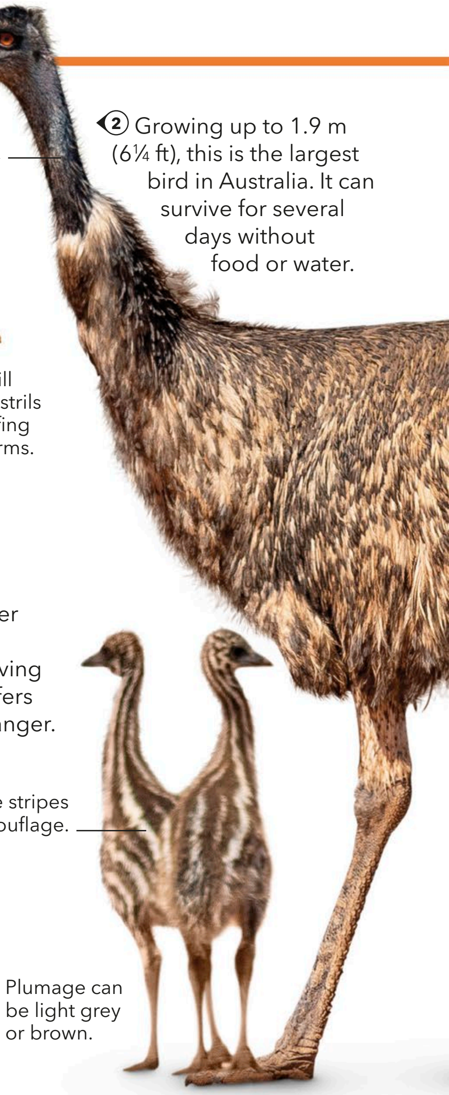
Bare skin

Colour of the bright double wattle may change when the bird is excited.



① Along with other members of its family, this is the national bird of New Zealand. Growing up to 65 cm (25 in) long, this small bird has fur-like plumage.

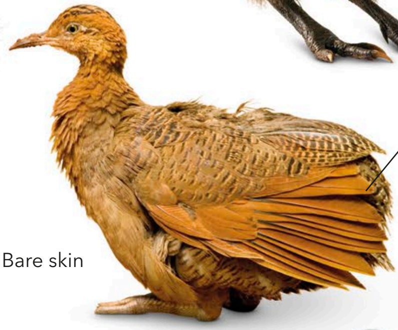
Long bill with nostrils for sniffing out worms.



Short, bare neck

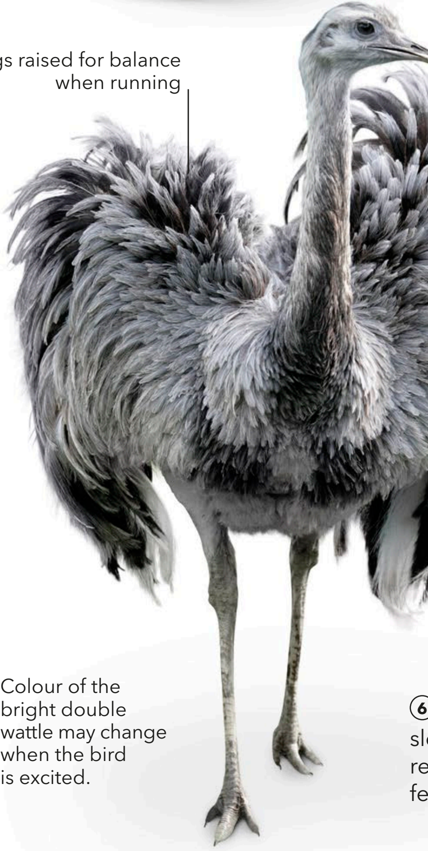
② Growing up to 1.9 m (6¼ ft), this is the largest bird in Australia. It can survive for several days without food or water.

Chicks have stripes for camouflage.



Reddish brown feathers

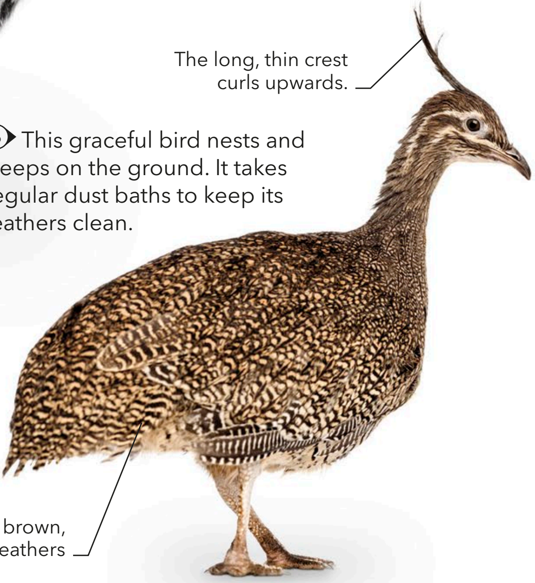
③ Unlike most other ratites, this South American ground-living bird can fly but prefers to run away from danger.



Wings raised for balance when running

Plumage can be light grey or brown.

⑤ At around 1.2 m (4 ft) tall and weighing up to 40 kg (88 lb), this is the largest bird in South America. The male mates with many females and then builds one nest where he looks after his eggs from all the females.



The long, thin crest curls upwards.

⑥ This graceful bird nests and sleeps on the ground. It takes regular dust baths to keep its feathers clean.

Yellowish brown, speckled feathers

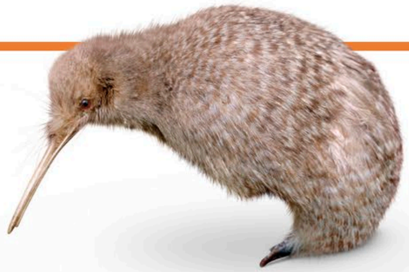
TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Ostrich	**Southern cassowary**	**Southern brown kiwi**
Emu	**Lesser rhea**	**Elegant crested tinamou**
Greater rhea	**Grey tinamou**	**Red-winged tinamou**
	Little spotted kiwi	**Northern cassowary**

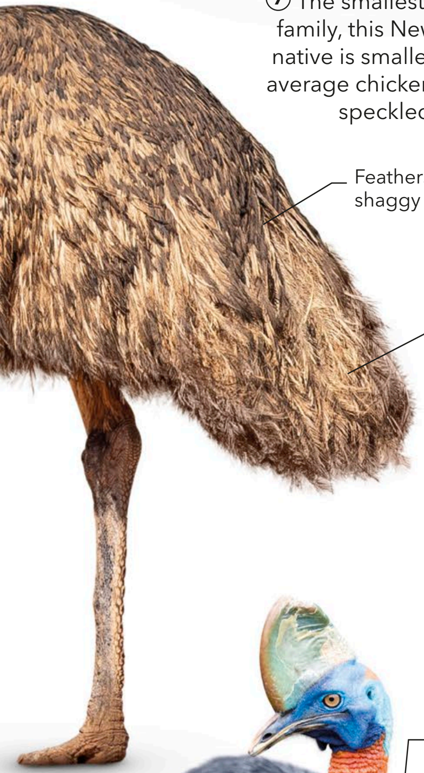
ANSWERS: 1. Southern brown kiwi 2. Emu 3. Red-winged tinamou 4. Southern cassowary 5. Greater rhea, 6. Elegant crested tinamou 7. Little spotted kiwi 8. Grey tinamou 9. Lesser rhea 10. Ostrich 11. Northern cassowary

Grounded!

Ostriches and their relatives make up a group of birds called ratites. These birds have wings but they are short, with small wing muscles, which means most ratites are unable to fly. This does not necessarily slow them down – ostriches can run faster than most horses can gallop, reaching speeds of up to 70 km/h (43 mph).

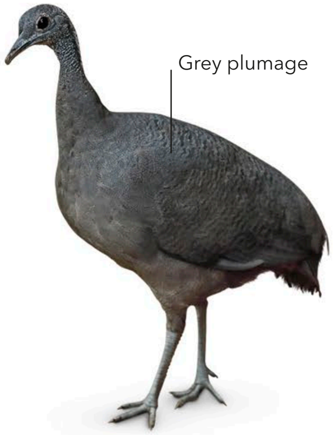


⑦ The smallest bird in its family, this New Zealand native is smaller than the average chicken, and has speckled feathers.



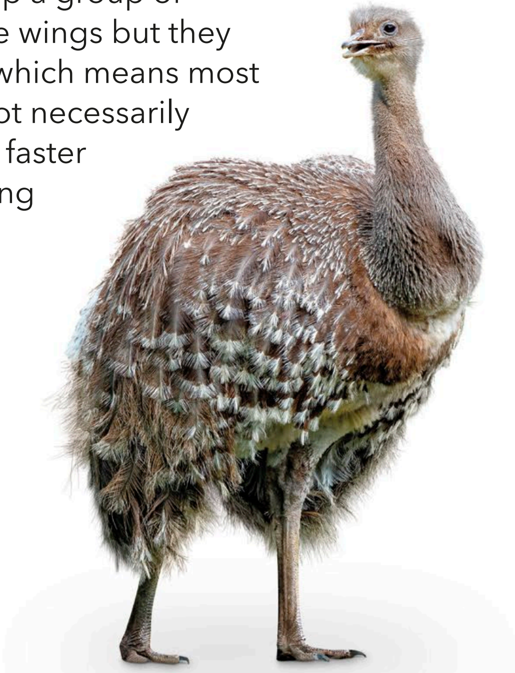
Feathers look like shaggy fur.

Stiff tail feathers are rattled to warn off predators.

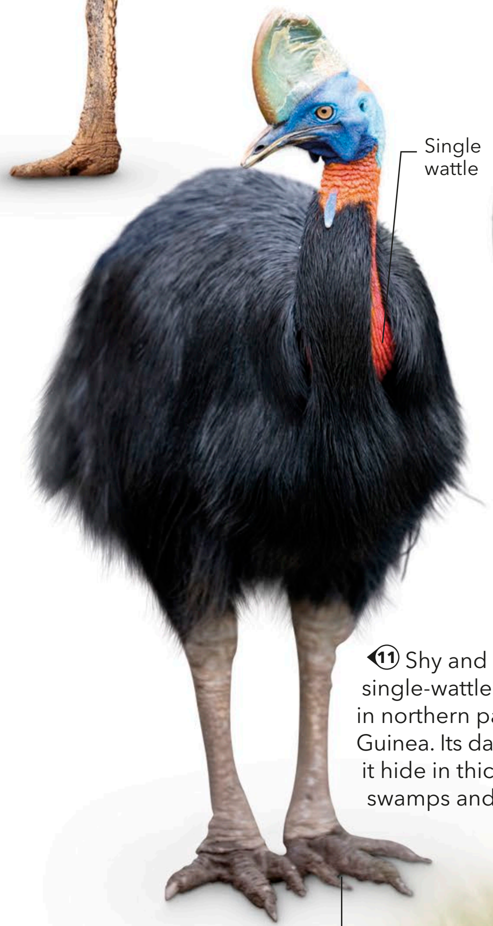


Grey plumage

⑧ A ground-living, ground-nesting bird from South America, it can fly, but only for short distances.



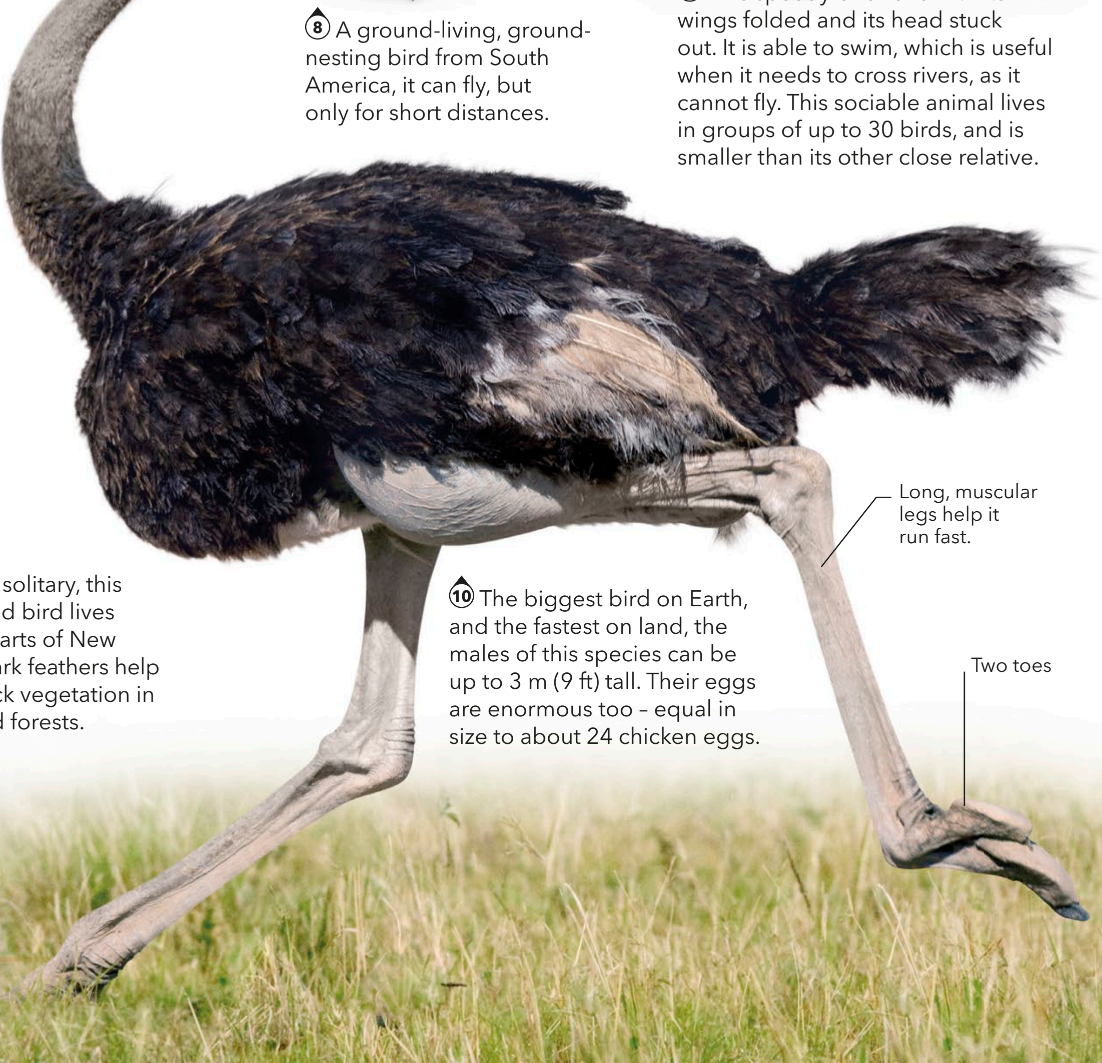
⑨ This speedy bird runs with its wings folded and its head stuck out. It is able to swim, which is useful when it needs to cross rivers, as it cannot fly. This sociable animal lives in groups of up to 30 birds, and is smaller than its other close relative.



Single wattle

⑪ Shy and solitary, this single-wattled bird lives in northern parts of New Guinea. Its dark feathers help it hide in thick vegetation in swamps and forests.

Strong three-toed feet, for jumping and kicking out if attacked.



Long neck almost bare of feathers

Long, muscular legs help it run fast.

Two toes

⑩ The biggest bird on Earth, and the fastest on land, the males of this species can be up to 3 m (9 ft) tall. Their eggs are enormous too – equal in size to about 24 chicken eggs.

TEST YOURSELF

STARTER

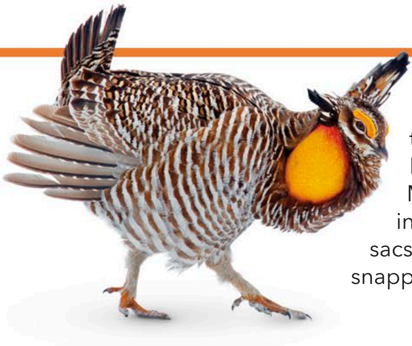
Indian peafowl
Grey partridge
Wild turkey
Common pheasant

CHALLENGER

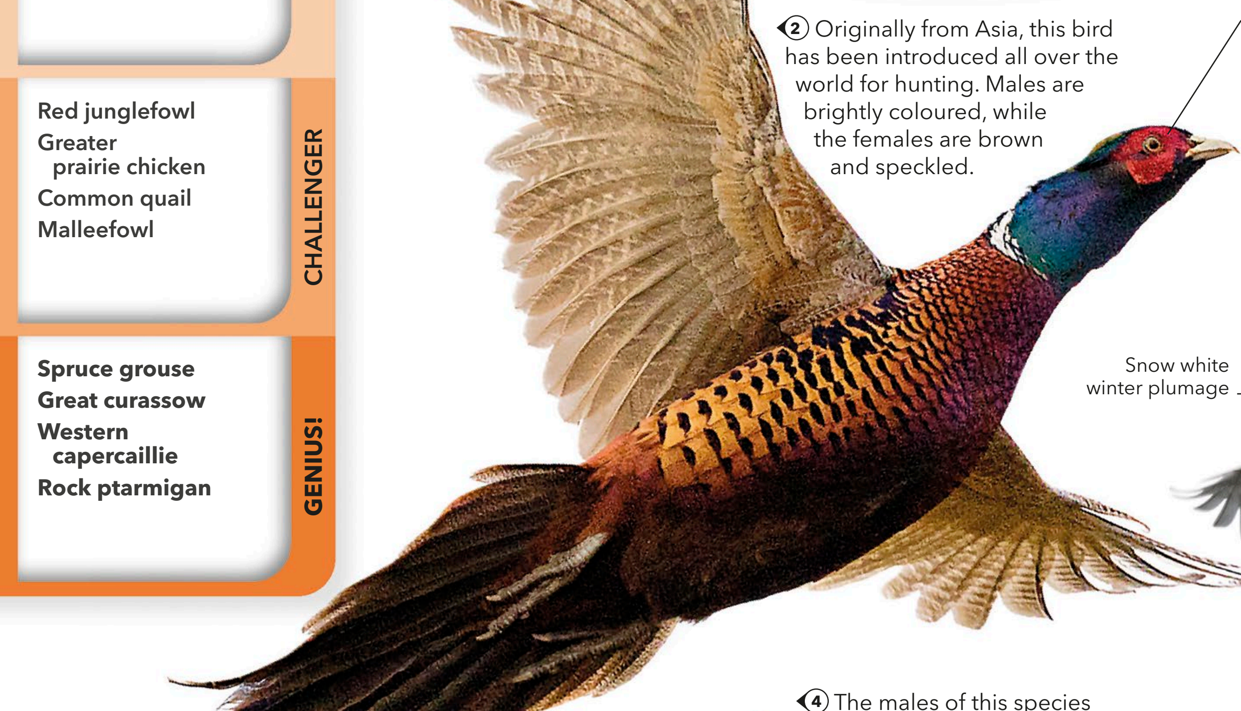
Red junglefowl
Greater prairie chicken
Common quail
Malleefowl

GENIUS!

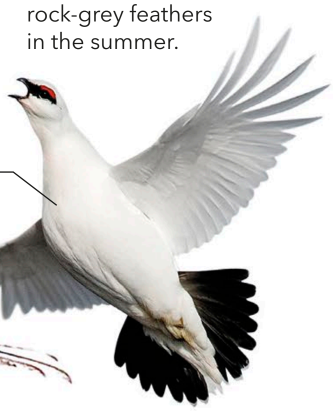
Spruce grouse
Great curassow
Western capercaillie
Rock ptarmigan



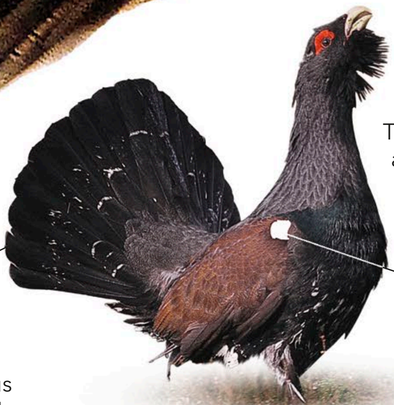
① At around 47 cm (18 in) tall, this is a large bird of the North American prairies. Males display to females by inflating the bright orange air sacs on their necks and making snapping noises with their tails.



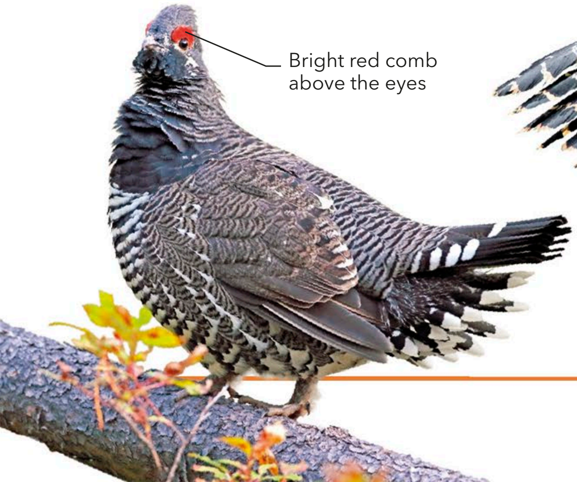
② Originally from Asia, this bird has been introduced all over the world for hunting. Males are brightly coloured, while the females are brown and speckled.



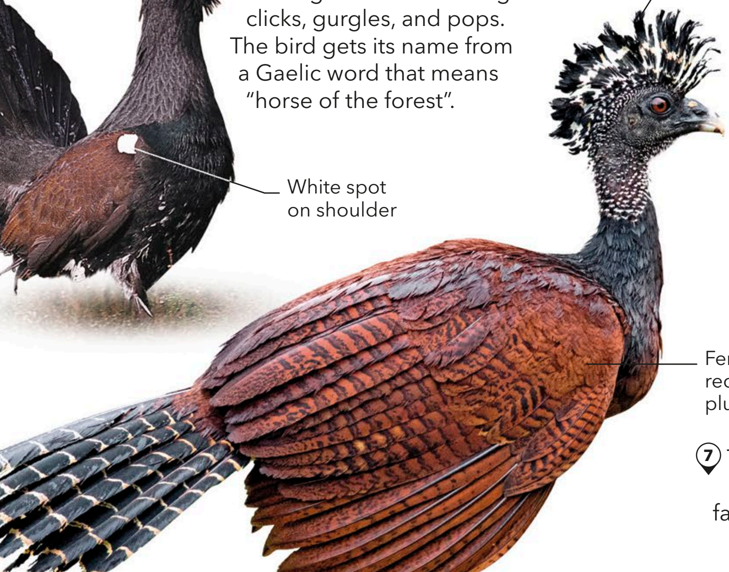
③ To survive in the Arctic, this bird has white plumage for camouflage in winter, and grows rock-grey feathers in the summer.



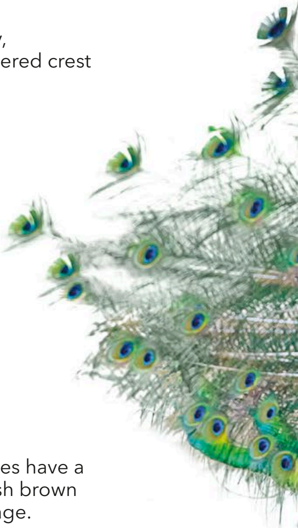
④ The males of this species perform complicated courtship dances, making strange noises including clicks, gurgles, and pops. The bird gets its name from a Gaelic word that means "horse of the forest".

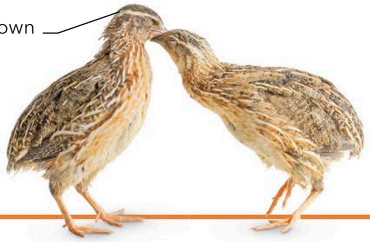


⑤ This bird is very well camouflaged in the coniferous forests where it lives. If a predator is nearby it freezes, only flying off at the last possible moment.



⑥ Large but secretive, this bird lives in the rainforests of Central America. Unlike its mostly ground-feeding relatives, it feeds on fruit and insects in the treetops.

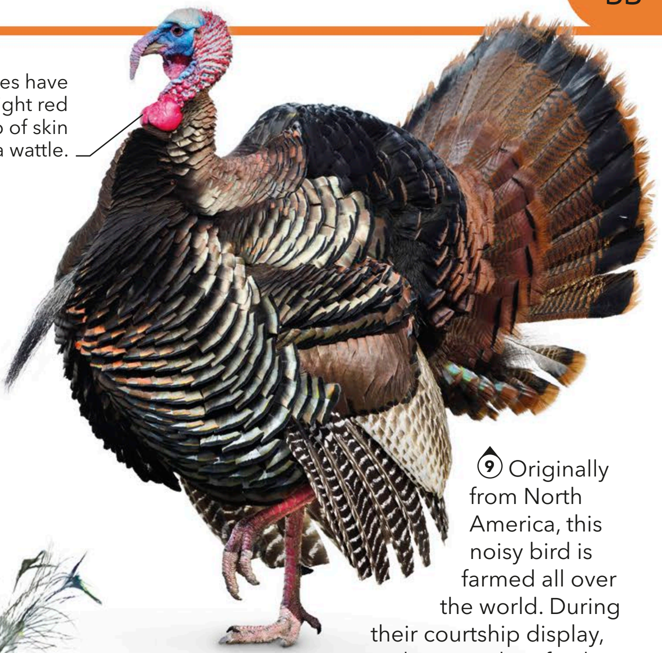




⑦ This little bird is hunted in the wild but is also farmed, both for its meat and for its tiny eggs.

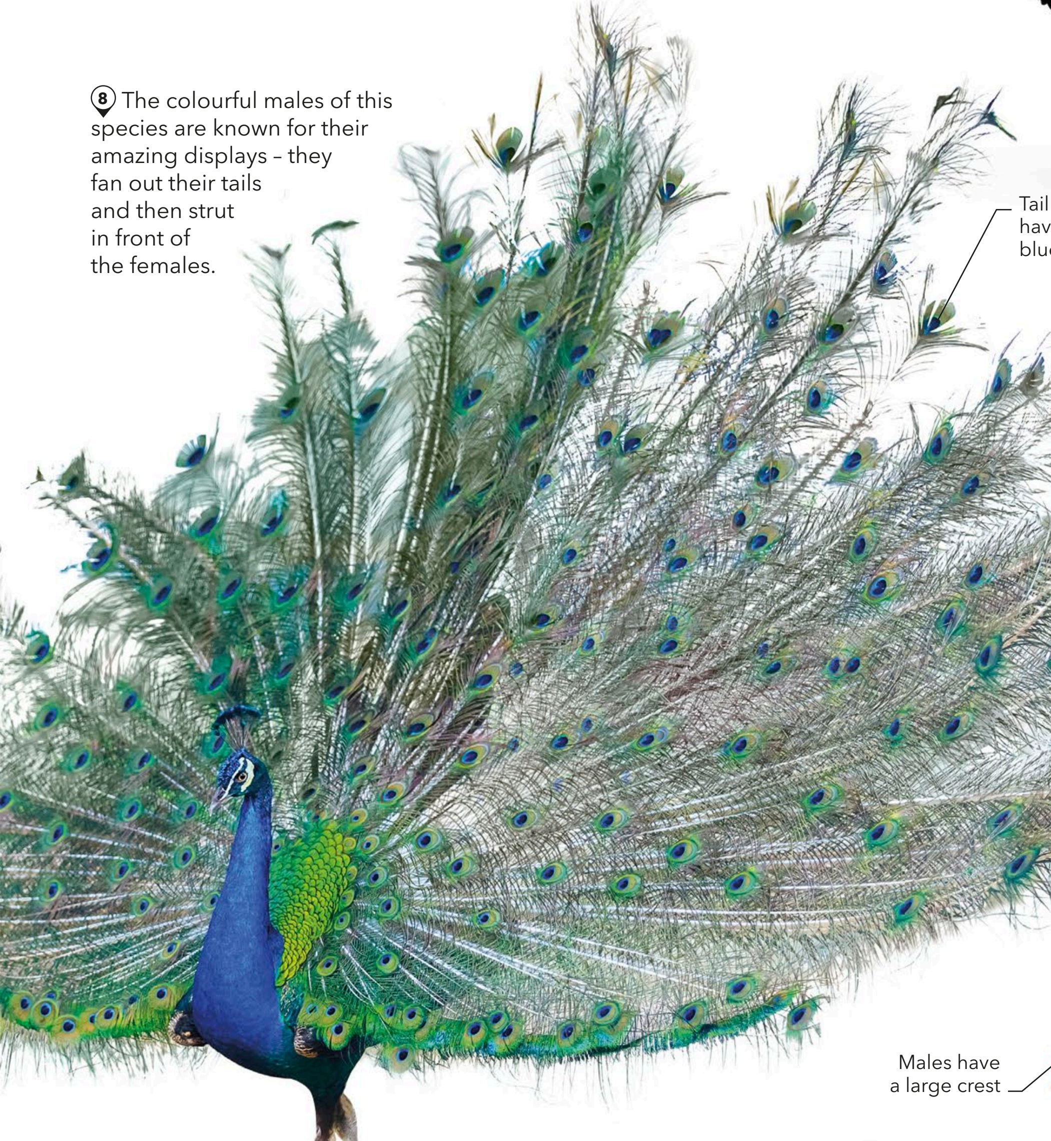
Game birds

This group of birds has long been hunted by humans, for food or for sport. Most of them spend their lives on the ground, taking to the skies only to escape from danger. Can you tell a quail from a capercaillie, or a grouse from a jungle fowl?



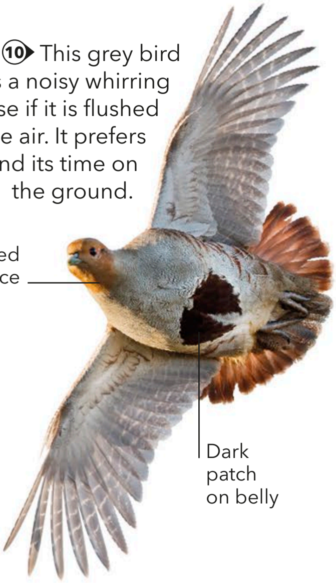
Males have a bright red flap of skin called a wattle.

⑨ Originally from North America, this noisy bird is farmed all over the world. During their courtship display, males raise their feathers, fan their tails, and make gobbling sounds.



⑧ The colourful males of this species are known for their amazing displays – they fan out their tails and then strut in front of the females.

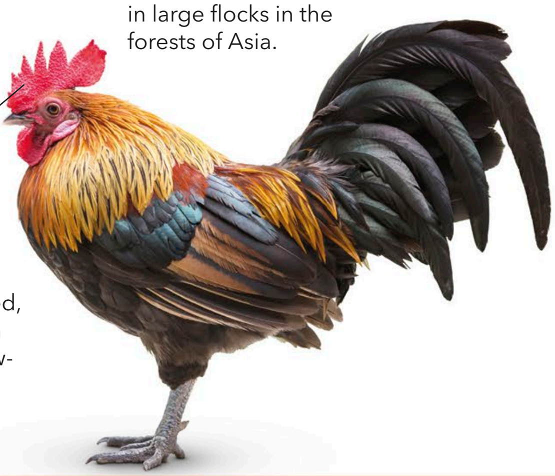
Tail feathers have green-and-blue "eyes".



⑩ This grey bird makes a noisy whirring noise if it is flushed into the air. It prefers to spend its time on the ground.

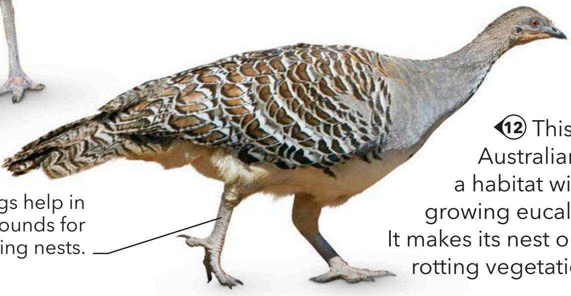
Brick-red face

Dark patch on belly



⑪ The ancestor of the domestic chicken, this colourful bird lives in large flocks in the forests of Asia.

Males have a large crest



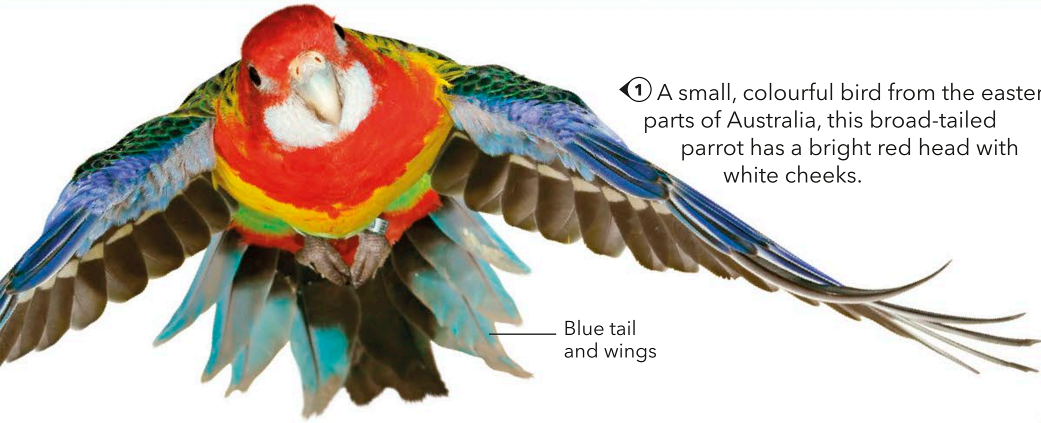
⑫ This chicken-sized, Australian bird lives in a habitat with dense, low-growing eucalyptus trees. It makes its nest out of warm, rotting vegetation.

Powerful legs help in digging mounds for building nests.

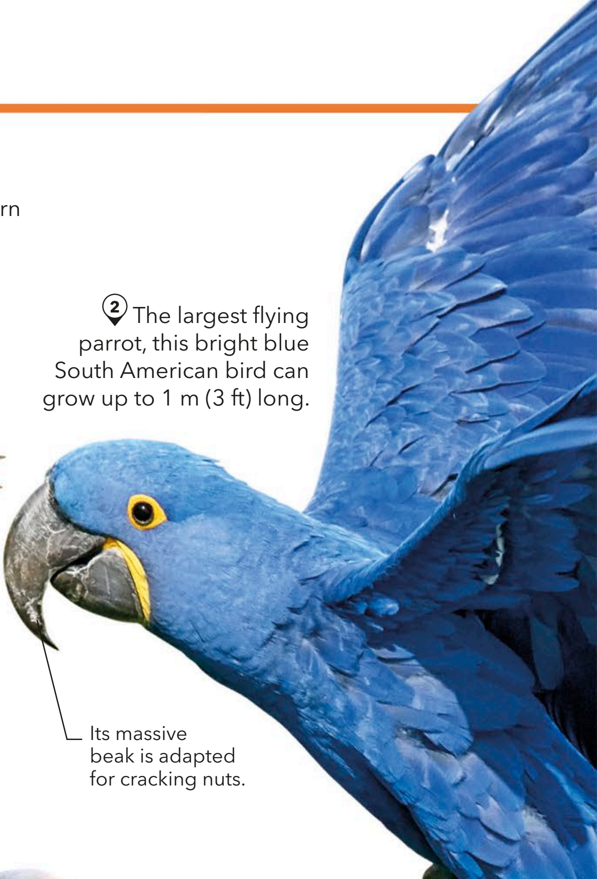
ANSWERS: 1. Greater prairie chicken 2. Common pheasant 3. Rock ptarmigan 4. Western capercaillie 5. Spruce grouse 6. Great curassow 7. Common quail 8. Indian peafowl 9. Wild turkey 10. Grey partridge 11. Red junglefowl 12. Malleefowl

Parrot parade

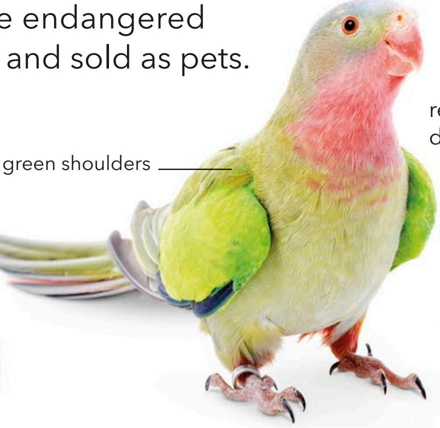
These gorgeous parrots are not just pretty faces – they are also among the most intelligent of birds. Most parrots are sociable birds, who enjoy living together in big flocks, and some species form long-term pair bonds with their partners. However, many of them are endangered because they are caught and sold as pets.



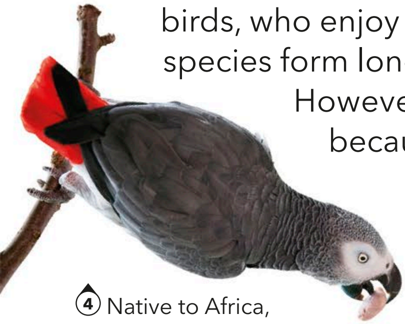
① A small, colourful bird from the eastern parts of Australia, this broad-tailed parrot has a bright red head with white cheeks.



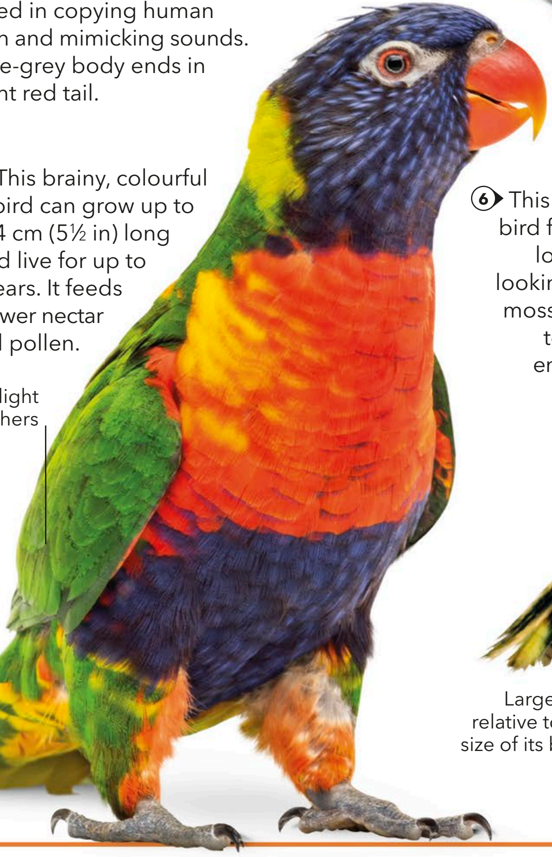
② The largest flying parrot, this bright blue South American bird can grow up to 1 m (3 ft) long.



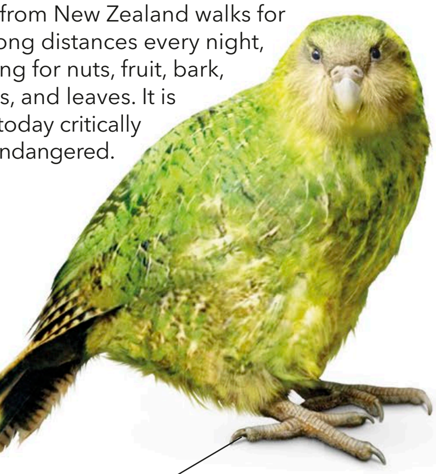
③ Named after royalty, this parrot reigns in Australian deserts. It constantly keeps moving on in search of seeds, fruit, and insects.



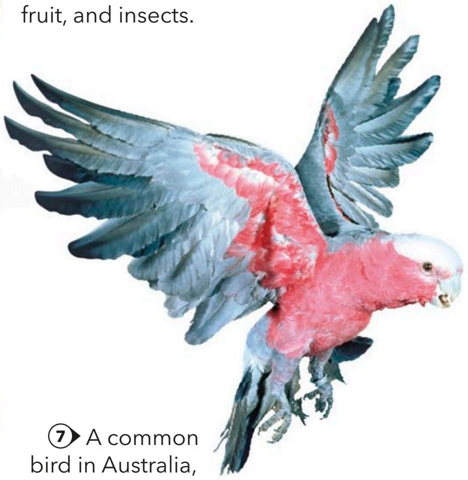
④ Native to Africa, this highly intelligent parrot is skilled in copying human speech and mimicking sounds. Its slate-grey body ends in a bright red tail.



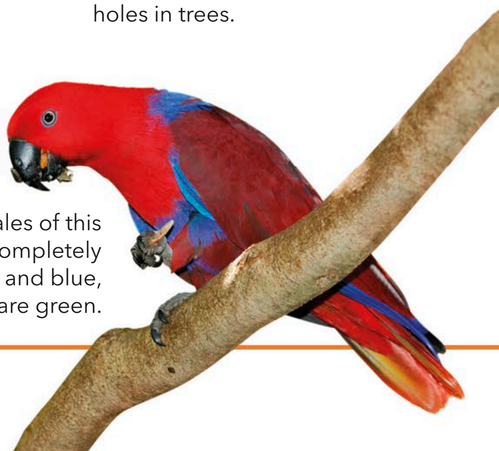
⑤ This brainy, colourful bird can grow up to 14 cm (5½ in) long and live for up to 30 years. It feeds on flower nectar and pollen.



⑥ This slow and flightless nocturnal bird from New Zealand walks for long distances every night, looking for nuts, fruit, bark, moss, and leaves. It is today critically endangered.

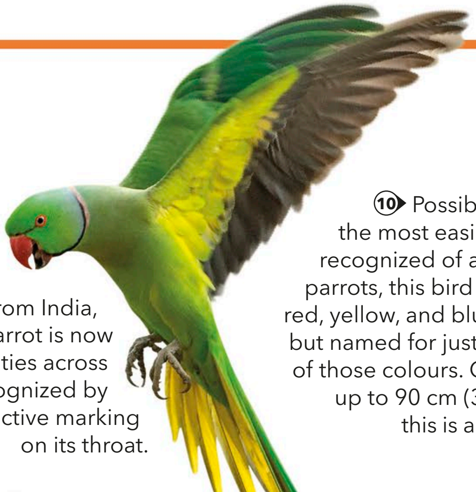


⑦ A common bird in Australia, this brightly coloured pink-and-grey parrot nests in holes in trees.

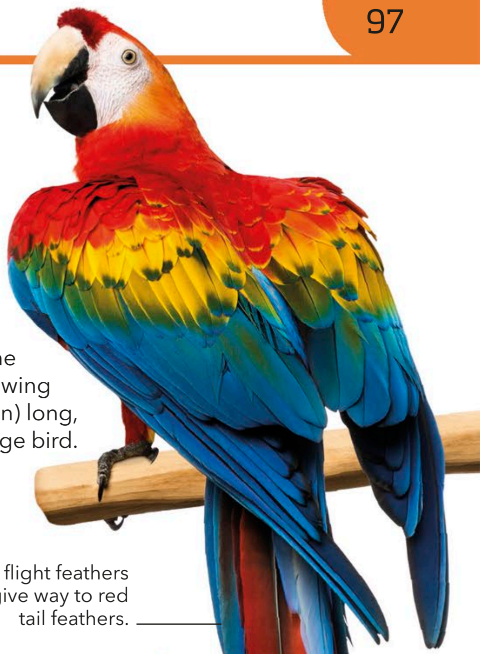


⑧ The males and females of this unusual parrot species look completely different. The females are red and blue, like this one, but males are green.

ANSWERS: 1. Eastern rosella 2. Hyacinth macaw 3. Princess parrot 4. Congo African grey parrot 5. Rainbow lorikeet 6. Kakapo 7. Galah 8. Eclectus parrot 9. Ring-necked parakeet 10. Scarlet macaw 11. Kea 12. Budgerigar 13. Sulphur-crested cockatoo 14. Rosy-faced lovebird 15. Olive-headed lorikeet

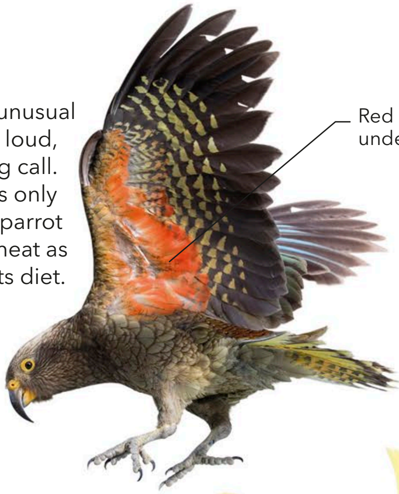


⑨ Originally from India, this little green parrot is now found in many cities across Europe. It is recognized by the distinctive marking on its throat.



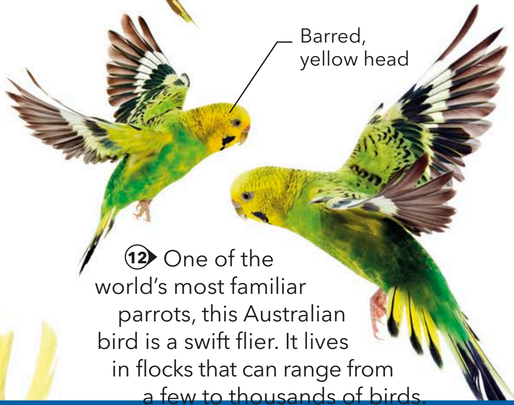
⑩ Possibly the most easily recognized of all parrots, this bird is red, yellow, and blue, but named for just one of those colours. Growing up to 90 cm (35 in) long, this is a huge bird.

Blue flight feathers give way to red tail feathers.



⑪ This unusual bird has a loud, screeching call. It is the world's only mountain-living parrot and eats rotting meat as part of its diet.

Red patch under wing



Barred, yellow head

⑫ One of the world's most familiar parrots, this Australian bird is a swift flier. It lives in flocks that can range from a few to thousands of birds.

The long blue tail has a black underside.

Bright yellow crest is raised when the bird is threatened.

⑬ This noisy bird is quite popular as a pet. When a flock feeds on the ground, one bird sits in a tree nearby, to watch out for predators.

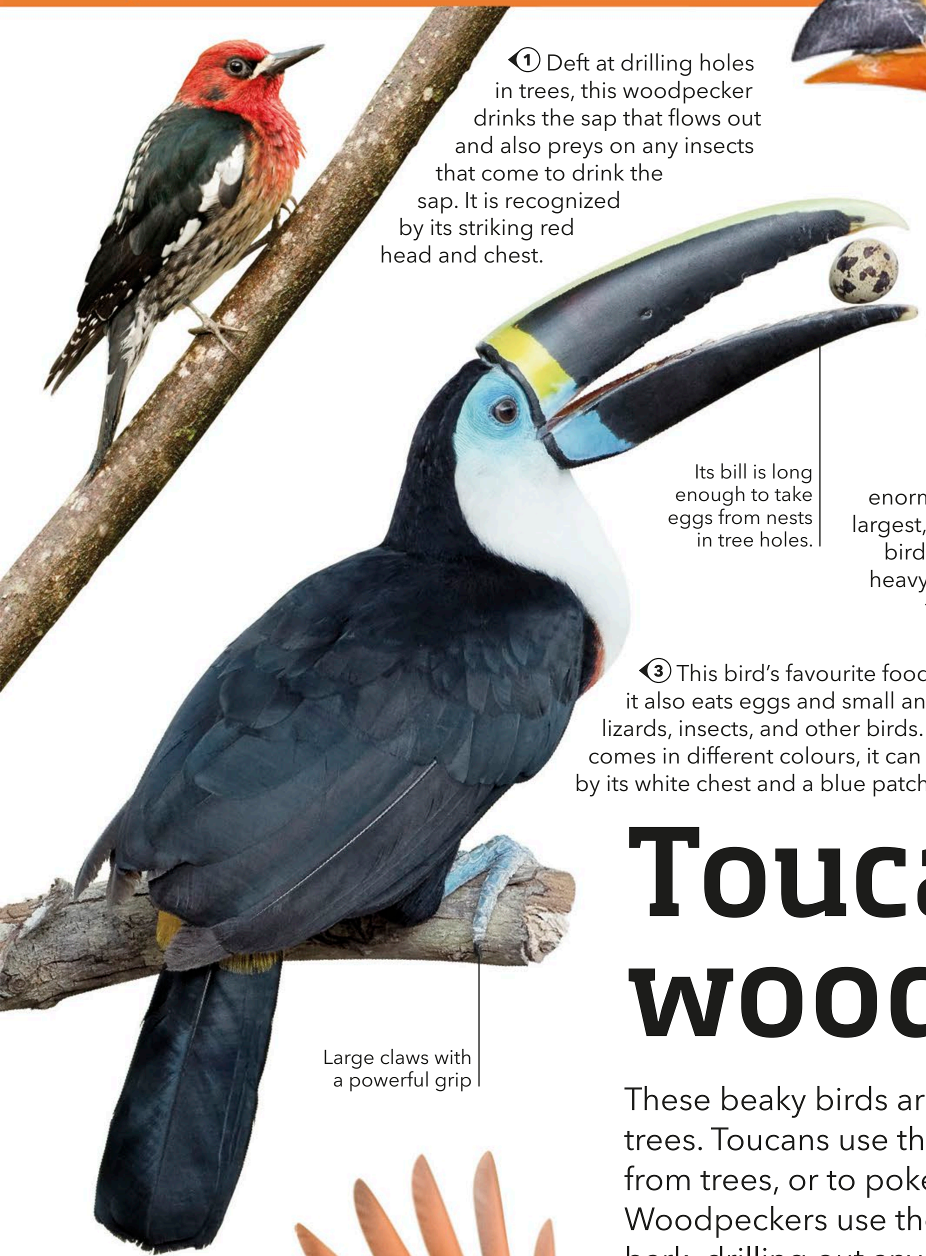
⑭ Small and pink-faced, this African parrot gathers in small groups. Pairs sleep close together, side-by-side, with their heads resting on each other.

White plumage except on its head and tail

⑮ This bird is only found on the island of Timor in Southeast Asia. The colour on its head contrasts with the bright green collar on its neck.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Budgerigar	**Olive-headed lorikeet**	**Galah**
Hyacinth macaw	**Congo African grey parrot**	**Eclectus parrot**
Sulphur-crested cockatoo	**Princess parrot**	**Kakapo**
Rosy-faced lovebird	**Ring-necked parakeet**	**Kea**
Scarlet macaw		**Eastern rosella**
Rainbow lorikeet		

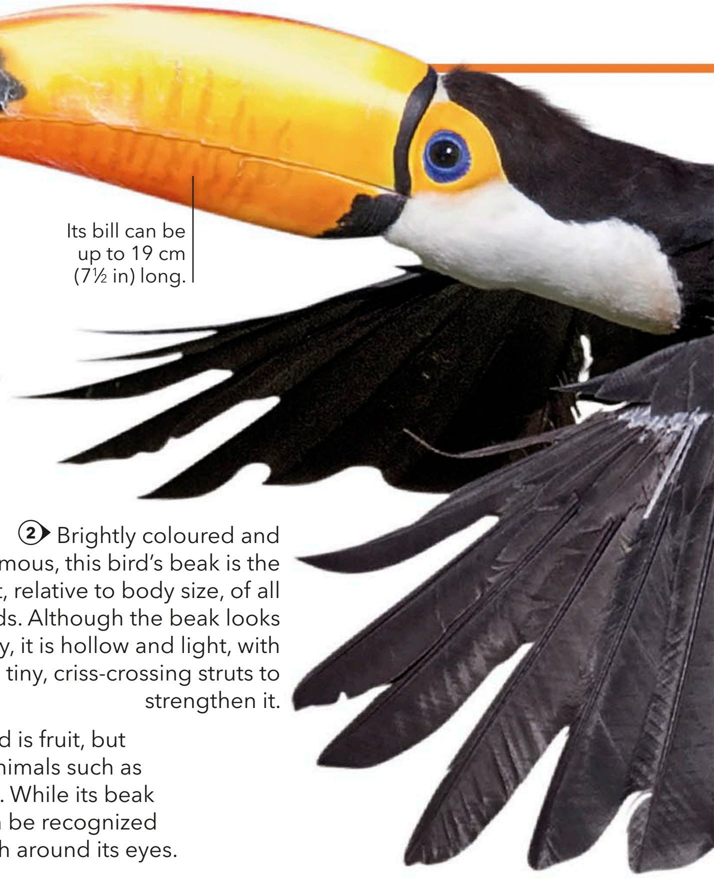


① Deft at drilling holes in trees, this woodpecker drinks the sap that flows out and also preys on any insects that come to drink the sap. It is recognized by its striking red head and chest.

Its bill is long enough to take eggs from nests in tree holes.

③ This bird's favourite food is fruit, but it also eats eggs and small animals such as lizards, insects, and other birds. While its beak comes in different colours, it can be recognized by its white chest and a blue patch around its eyes.

Large claws with a powerful grip

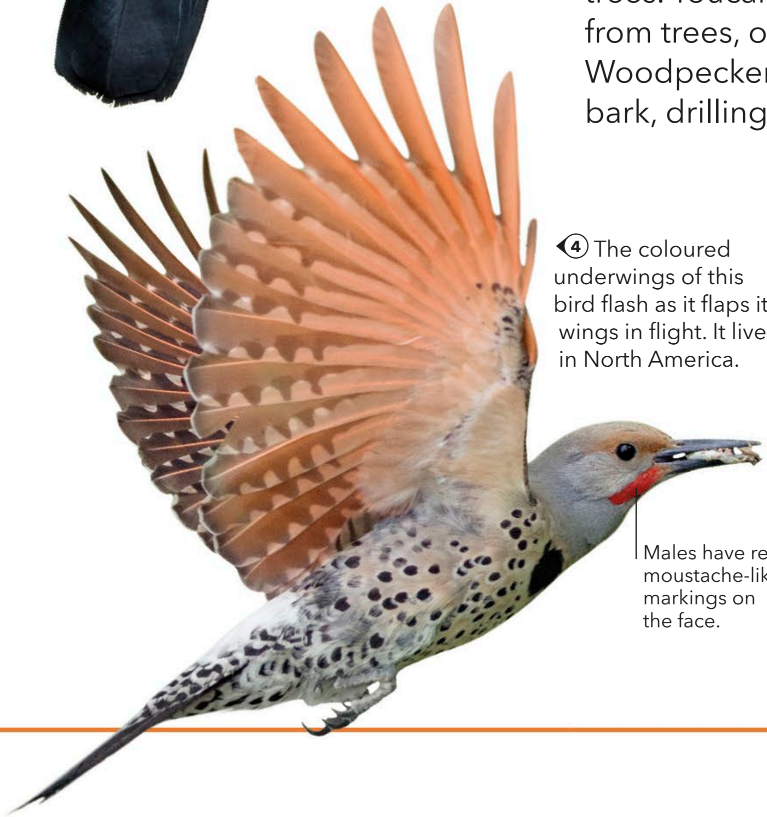


Its bill can be up to 19 cm (7½ in) long.

② Brightly coloured and enormous, this bird's beak is the largest, relative to body size, of all birds. Although the beak looks heavy, it is hollow and light, with tiny, criss-crossing struts to strengthen it.

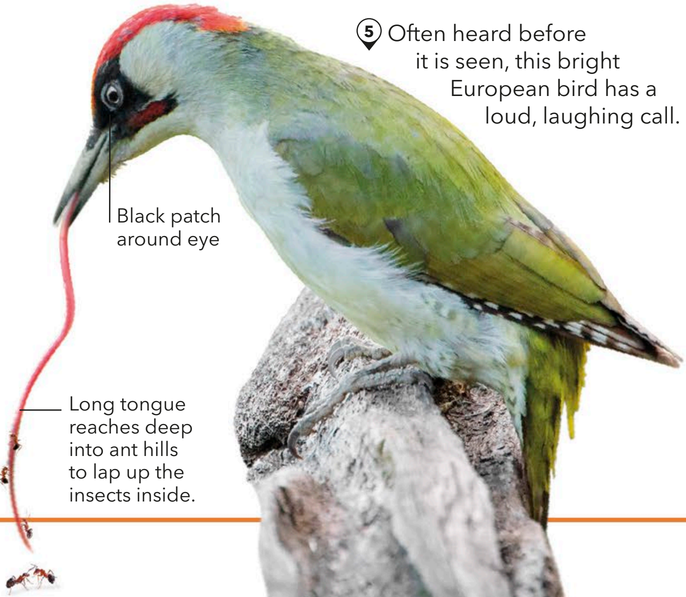
Toucans and woodpeckers

These beaky birds are perfectly adapted for living in trees. Toucans use their long, light beaks to reach fruit from trees, or to poke into tree holes to pull out prey. Woodpeckers use their strong beaks to hammer into bark, drilling out any insects hiding within.



④ The coloured underwings of this bird flash as it flaps its wings in flight. It lives in North America.

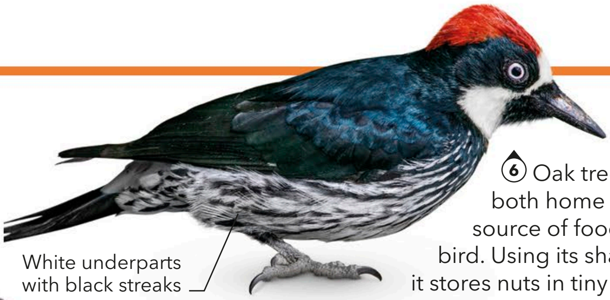
Males have red, moustache-like markings on the face.



⑤ Often heard before it is seen, this bright European bird has a loud, laughing call.

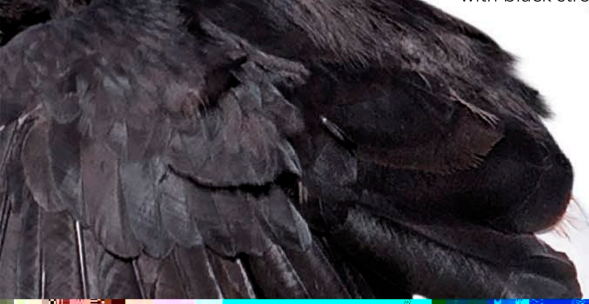
Black patch around eye

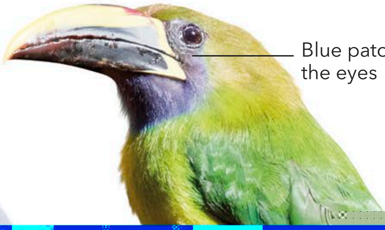
Long tongue reaches deep into ant hills to lap up the insects inside.



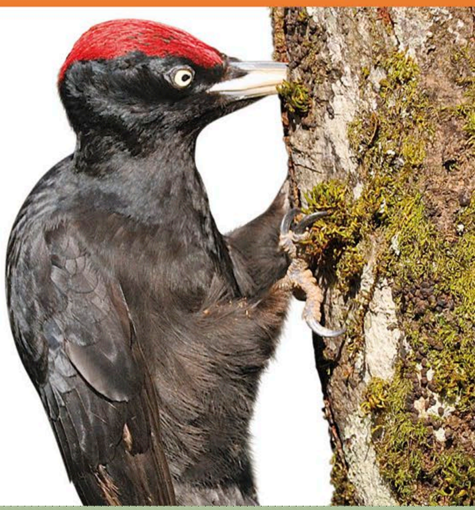
White underparts with black streaks

⑥ Oak trees are both home and a source of food for this bird. Using its sharp beak, it stores nuts in tiny holes it makes or finds in tree bark.





Blue patch below the eyes



Flexible tail can be folded to touch the head.

Short, rounded wings are only used for brief flights.

⑦ Dull in colour at birth, this Central American bird takes on a bright, jewel-green colour as it becomes an adult. This makes it almost impossible to spot among the leaves of the tropical forests.

⑧ At around 55 cm (21 in) long, this bird has a striking red crown. It drills into dead wood to find insects to eat, while its stiff tail feathers help it to keep balance.

Barb-like bristles around the beak

Jagged edges on beak are helpful for picking and eating fruit.

⑨ At about 32 cm (13 in) long, this is the largest bird in its family. It is found at altitudes of up to 3,000 m (9,842 ft) in South and Southeast Asia.

⑩ This bird has a bright yellow and red breast with a black horizontal band running through the middle. It eats fruit mostly, but will also catch small prey such as insects and lizards.

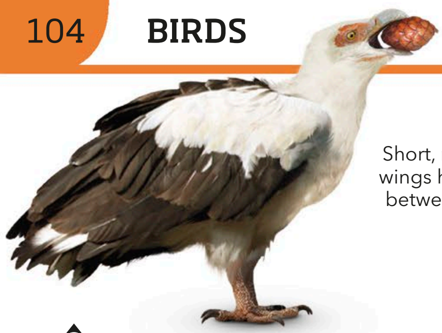
TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Toco toucan Green woodpecker White-throated toucan	**Northern flicker** **Red-breasted sapsucker** **Black woodpecker** **Emerald toucanet**	**Collared aracari** **Acorn woodpecker** **Great barbet**

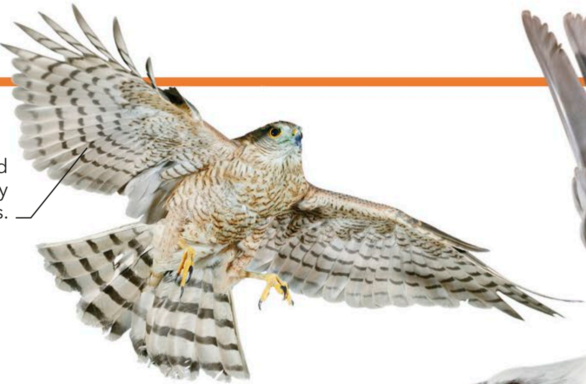
ANSWERS: 1. Red-breasted sapsucker 2. Toco toucan 3. White-throated toucan 4. Northern flicker 5. Green woodpecker 6. Acorn woodpecker 7. Emerald toucanet 8. Black woodpecker 9. Great barbet 10. Collared aracari

Birds of prey

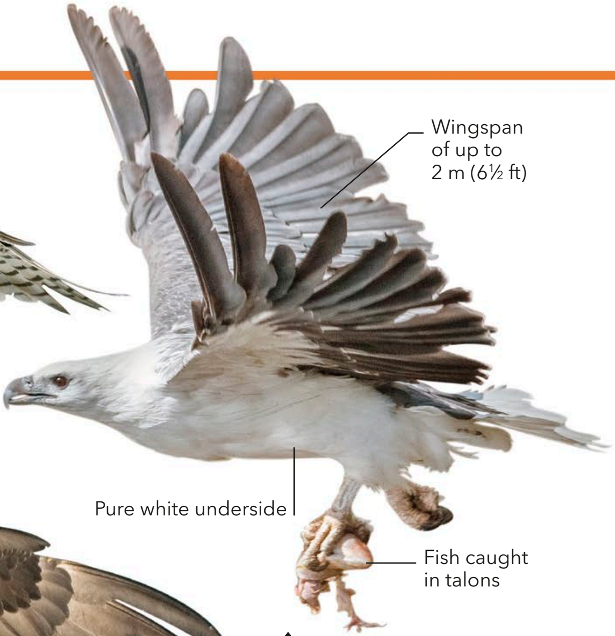
With razor-sharp claws and hooked beaks, birds of prey – or raptors – are top predators. Most of them hunt live prey, taking to the skies to look for mice, frogs, fish, or other birds to eat. Some are scavengers and feed on carrion – the remains of dead animals.



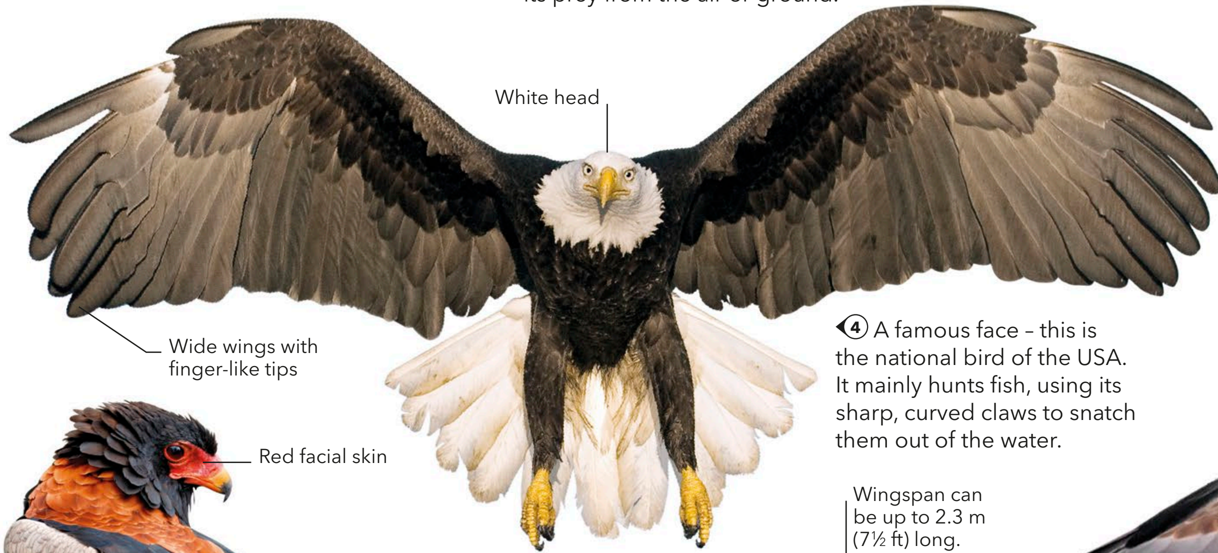
① Unusually for a bird of prey, this bird eats mostly fruit, from one particular type of tree. It uses its hooked beak to tear through the fruit's tough skin.



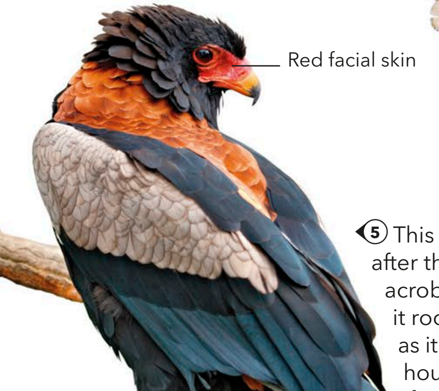
② This forest hunter is found across Europe and parts of Asia. It hides in a tree or bush, waiting for small birds to appear. It then darts out to snatch its prey from the air or ground.



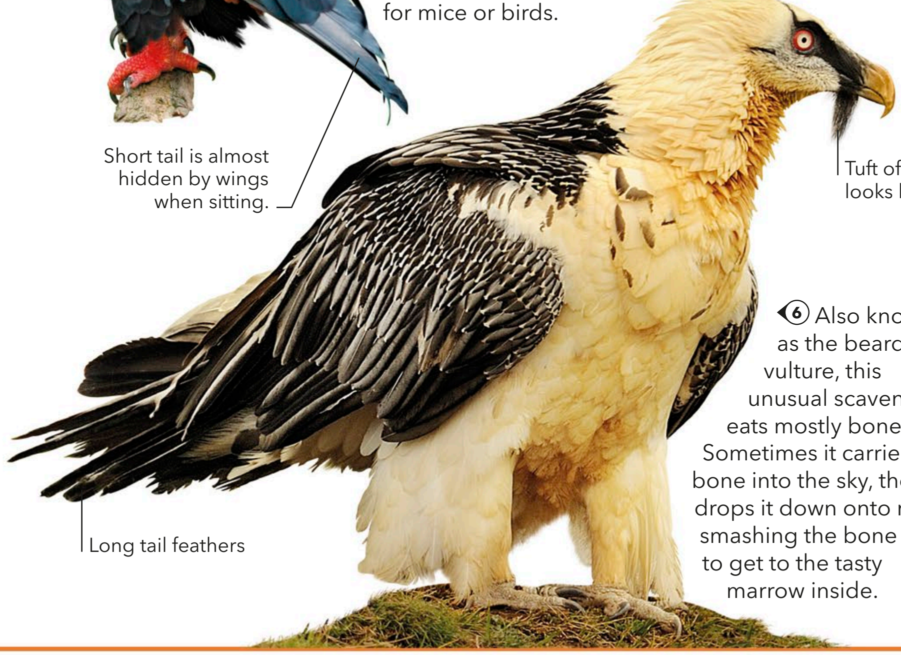
③ While it mainly hunts for fish, this bird will eat whatever it can find, including frogs, small birds, and carrion. Pairs of birds sometimes hunt together.



④ A famous face – this is the national bird of the USA. It mainly hunts fish, using its sharp, curved claws to snatch them out of the water.

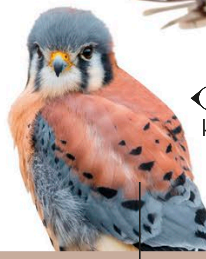


⑤ This African bird is named after the French word for an acrobat because of the way it rocks from side to side as it flies. It hunts for long hours each day, looking for mice or birds.



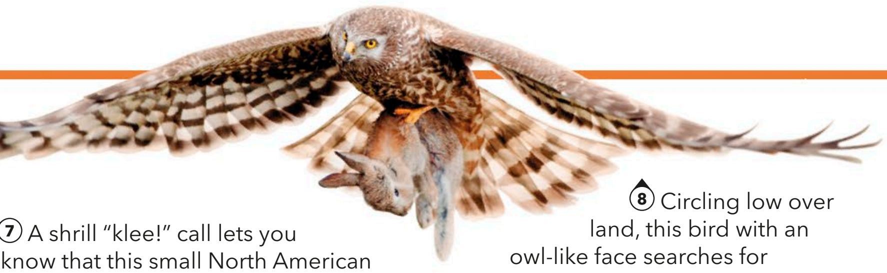
⑥ Also known as the bearded vulture, this unusual scavenger eats mostly bones. Sometimes it carries a bone into the sky, then drops it down onto rocks, smashing the bone open to get to the tasty marrow inside.

ANSWERS: 1. Palm-nut vulture 2. Eurasian sparrowhawk 3. White-bellied sea eagle 4. Bald eagle 5. Bateleur 6.Lammergeier 7. American kestrel 8. Northern harrier 9. Golden eagle, 10. Crested caracara 11. King vulture 12. Peregrine falcon

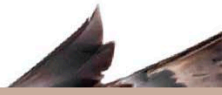


⑦ A shrill "klee!" call lets you know that this small North American falcon is overhead. It has black sideburn-like bands on the sides of the face, and tends to bob its tail when perched.

Chestnut back with black flecks



⑧ Circling low over land, this bird with an owl-like face searches for small animal prey. It has especially good hearing, and can hear tiny movements below. This graceful flyer has a jet plane named after it!



White feathers indicate that these are young birds.

⑨ One of the largest raptors and weighing more than 6 kg (13 lb), this bird is named after its shiny yellow-brown crown feathers. It hunts everything from reptiles and small mammals to fish.

Fanned tail helps the bird to slow down before impact.

Pale blue beak

Crest of dark feathers

Narrow wings tucked into the body when diving

⑩ Unlike most other falcons, this bird stays on the ground, strutting around on its long legs, rooting for food. It eats carrion as well as small animals, and even insects it digs up with its flat claws.

⑪ This animal is a prime scavenger. It uses its sharp, hooked beak to tear open tough flesh. Treated like royalty, it gets first pick of any carrion, even if it was found by other birds!

Fleshy, orange growth above its beak

Band of black feathers across the wing edges

⑫ In a technique called "stooping", this superb hunter plummets down at incredible speeds of up to 322 km/h (200 mph), and catches its prey in mid-air, making it the fastest bird on earth.

TEST YOURSELF

STARTER

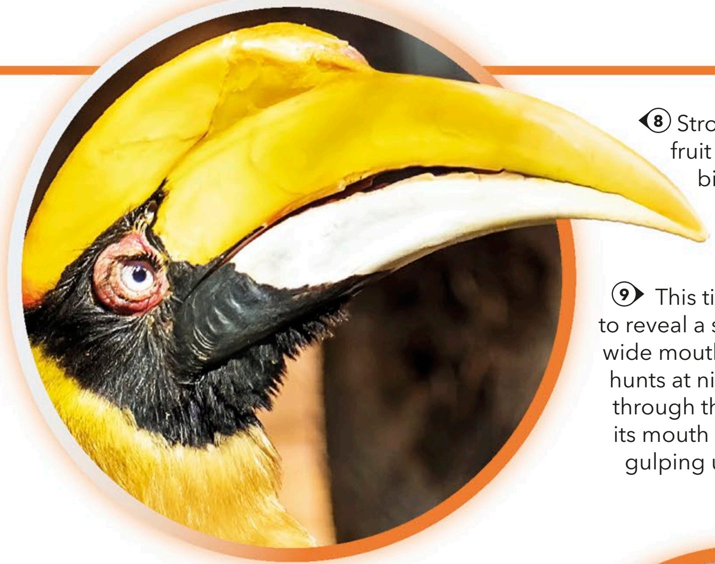
- Bald eagle
- Peregrine falcon
- White-bellied sea eagle
- Golden eagle

CHALLENGER

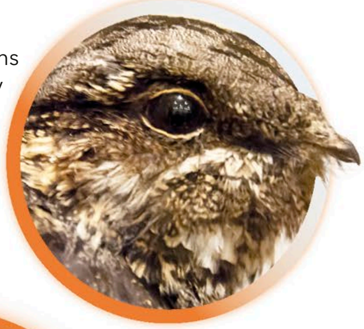
- **Palm-nut vulture**
- **Northern harrier**
- **American kestrel**
- **King vulture**

GENIUS!

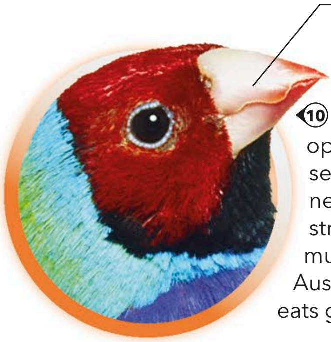
- **Lammergeier**
- **Bateleur**
- **Crested caracara**
- **Eurasian sparrowhawk**



⑧ Strong and hard, this beak is perfect for picking fruit and snapping up lizards, insects, and smaller birds. The purpose of the distinctive shield on top of its head is not known.

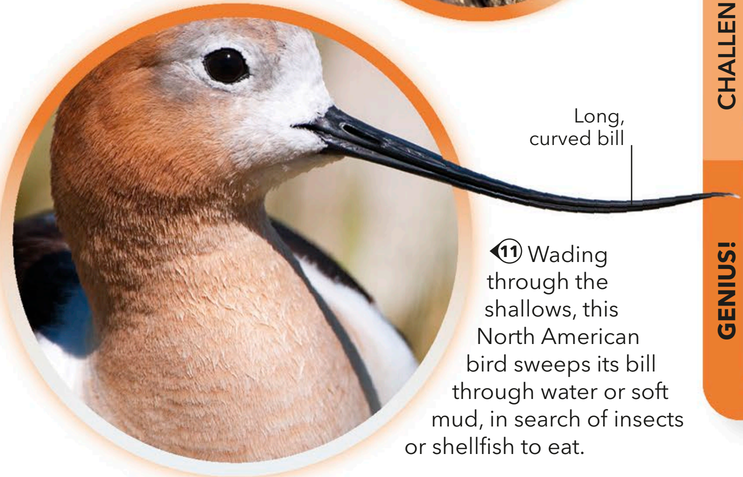


⑨ This tiny bill opens to reveal a surprisingly wide mouth. The bird hunts at night, flying through the air with its mouth open and gulping up insects.



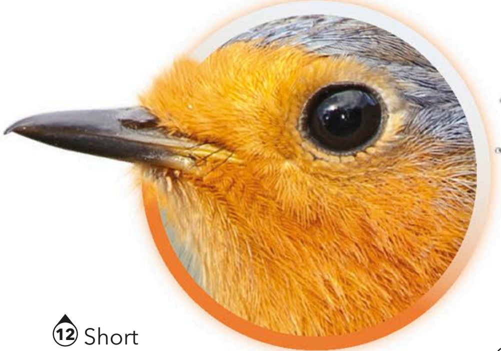
Wide, triangle-shaped beak

⑩ To crack open tough seeds, birds need an extra-strong beak. This multi-coloured Australian bird mainly eats grass seeds.

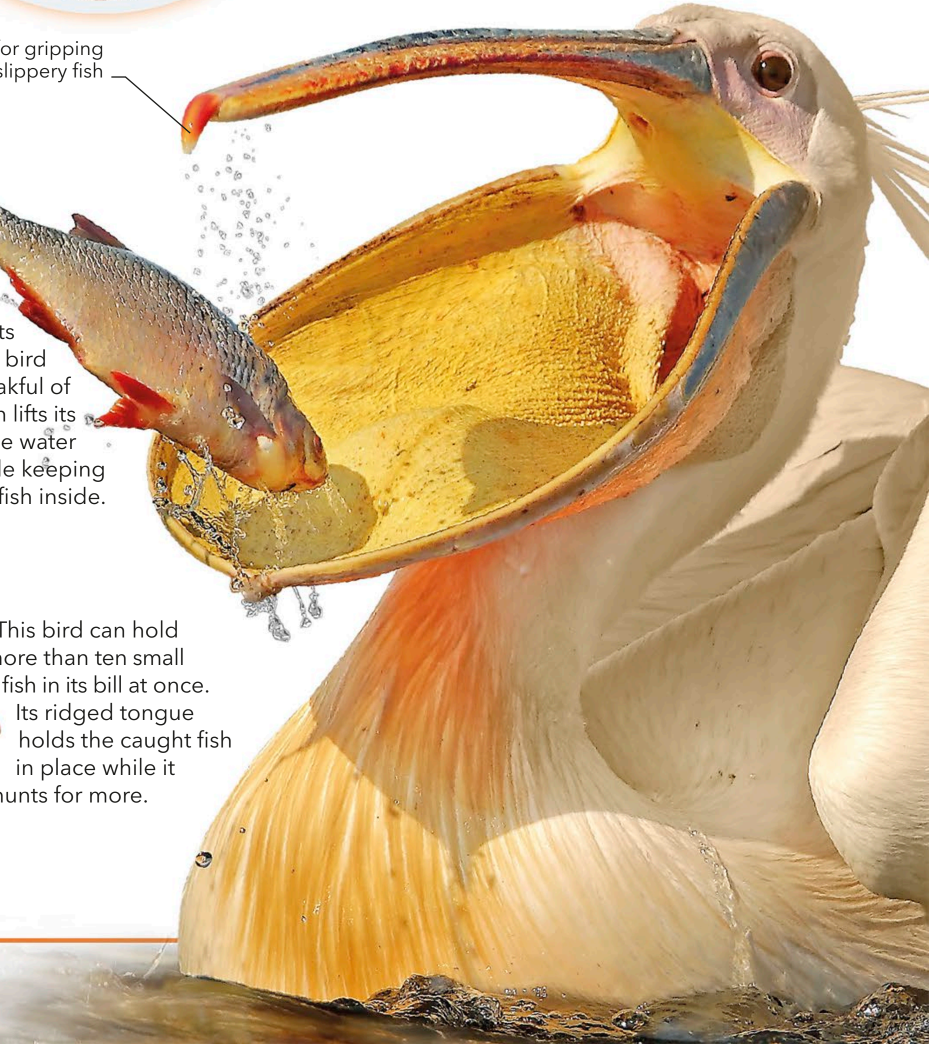


Long, curved bill

⑪ Wading through the shallows, this North American bird sweeps its bill through water or soft mud, in search of insects or shellfish to eat.

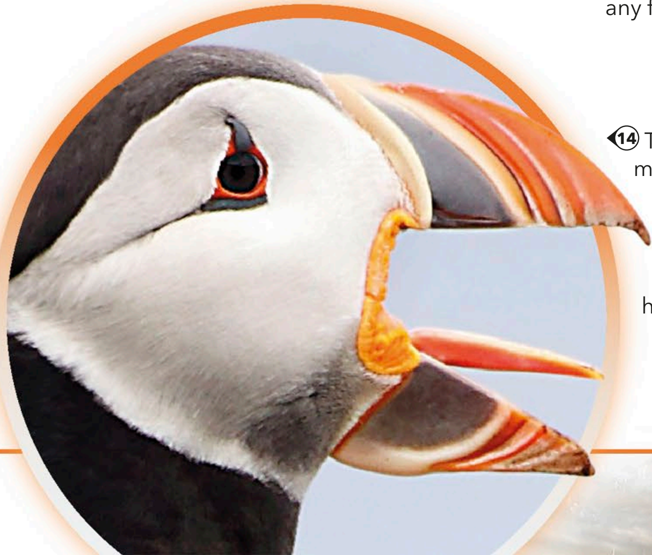


⑫ Short and thin, this orange-red-chested bird's beak is multi-purpose – it is good for both picking up seeds and for catching insects and worms.



Hook for gripping slippery fish

⑬ A pouch on its throat enables this bird to scoop up a beakful of water and fish. It then lifts its head to push the water back out while keeping any fish inside.



⑭ This bird can hold more than ten small fish in its bill at once. Its ridged tongue holds the caught fish in place while it hunts for more.

TEST YOURSELF

STARTER

Anna's hummingbird
Great white pelican
Atlantic puffin
Wreathed hornbill

CHALLENGER

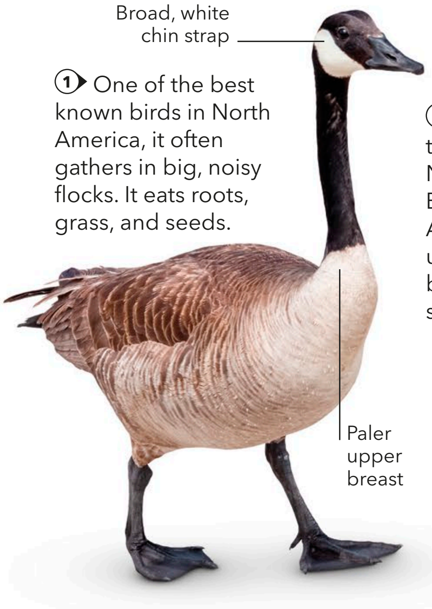
Golden eagle
Red-breasted merganser
Eurasian spoonbill
Crossbill
European robin

GENIUS!

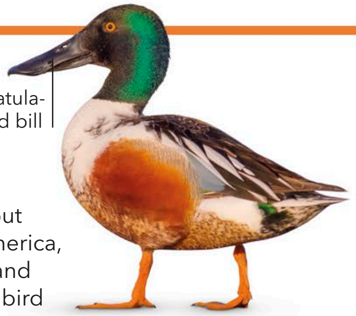
European nightjar
American avocet
Crimson sunbird
Marabou stork
Gouldian finch

Ducks and geese

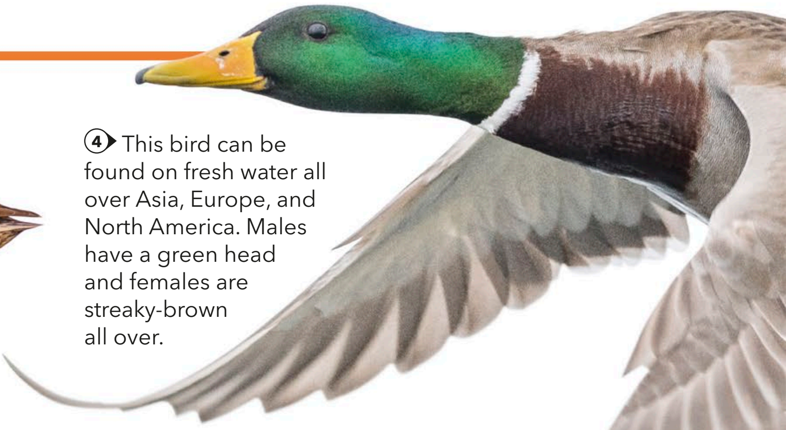
These birds are strong swimmers and spend their whole lives on or near water. Their webbed feet propel them across the surface of the water, and glands near their tails produce oil to keep their feathers waterproof. Powerful fliers, some species migrate long distances to breed.



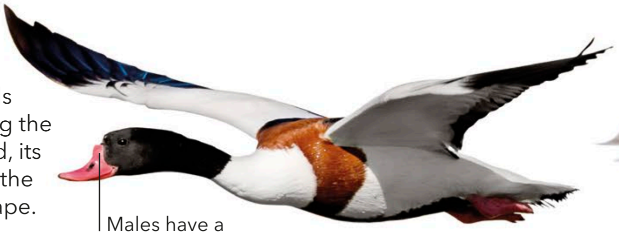
① One of the best known birds in North America, it often gathers in big, noisy flocks. It eats roots, grass, and seeds.



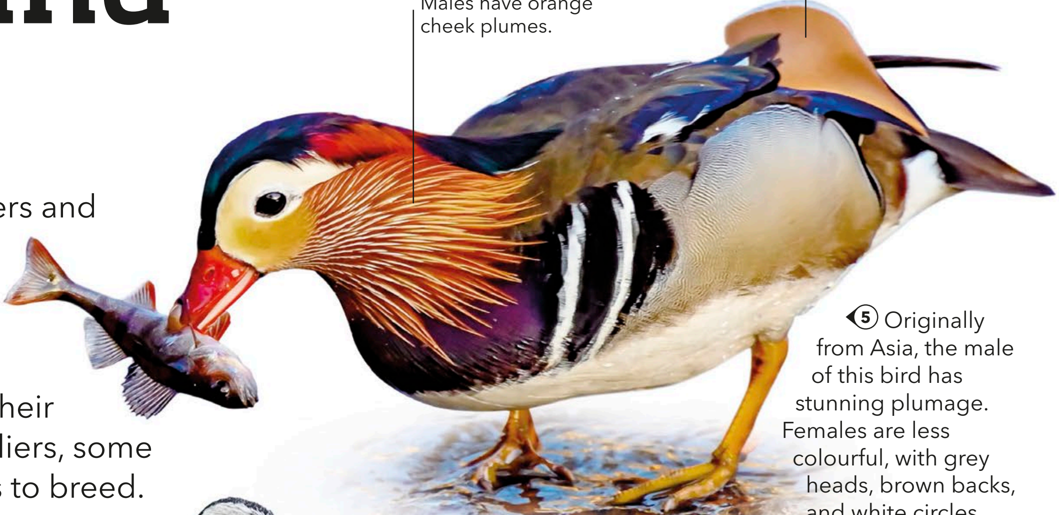
② Seen throughout North America, Europe, and Asia, this bird uses its unique bill to filter tiny animals and seeds out of the water to eat.



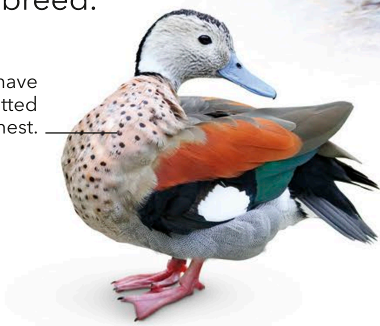
④ This bird can be found on fresh water all over Asia, Europe, and North America. Males have a green head and females are streaky-brown all over.



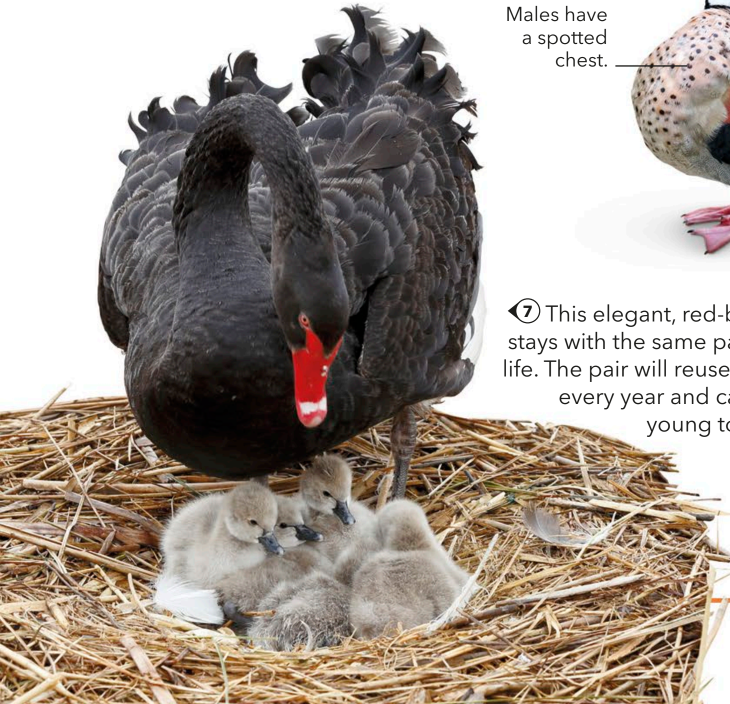
③ Usually seen in pairs, this bird spends most of its life along the coastline. If threatened, its young will dive into the water to escape.


Males have orange cheek plumes.
Orange "sails" are used for display.

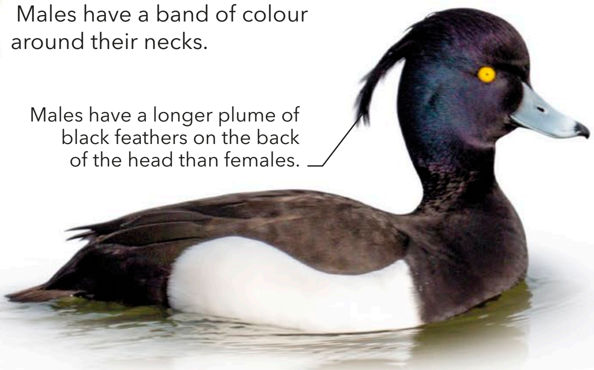
⑤ Originally from Asia, the male of this bird has stunning plumage. Females are less colourful, with grey heads, brown backs, and white circles around the eyes.



⑥ Long, pointed claws enable this bird to perch in trees. Males have a band of colour around their necks.

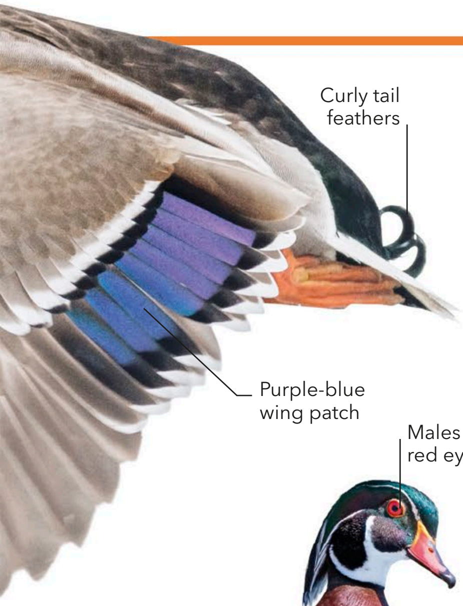


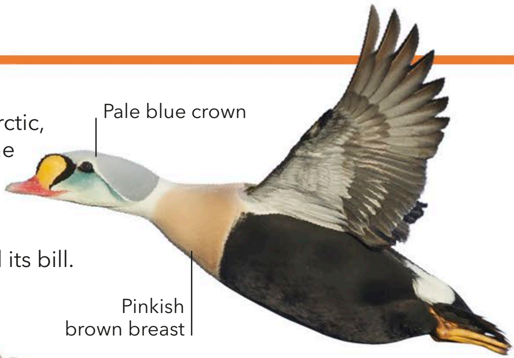
⑦ This elegant, red-billed bird usually stays with the same partner its whole life. The pair will reuse the same nest every year and care for their young together.


Males have a longer plume of black feathers on the back of the head than females.

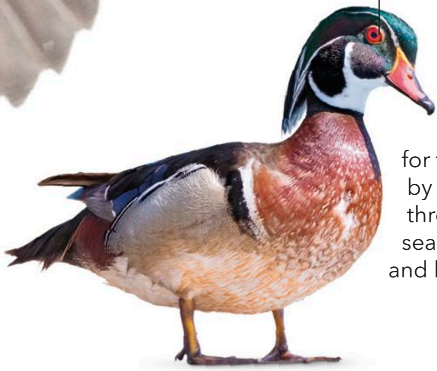
⑧ The black tip on its bill, bright yellow eyes, and plume make this bird stand out. It feeds on plants and small animals by diving under the water.

ANSWERS: 1. Canada goose 2. Northern shoveler 3. Common shelduck 4. Mallard 5. Mandarin duck 6. Ringed teal 7. Black swan 8. Tufted duck 9. King eider 10. Wood duck 11. Greylag goose 12. Smew 13. Whooper swan

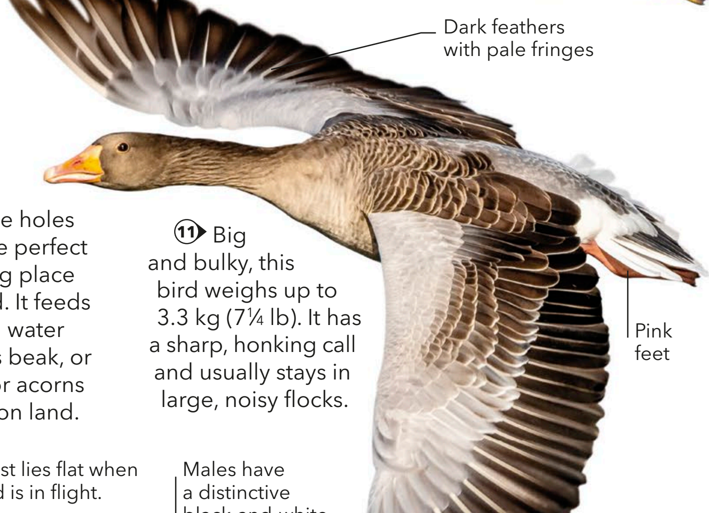




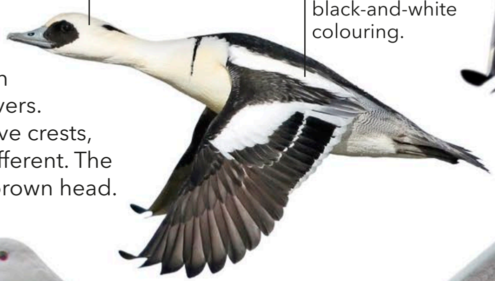
⑨ Found across the Arctic, this bird breeds on the coasts of Alaska, Canada, and Greenland. The male has bright colours around its bill.



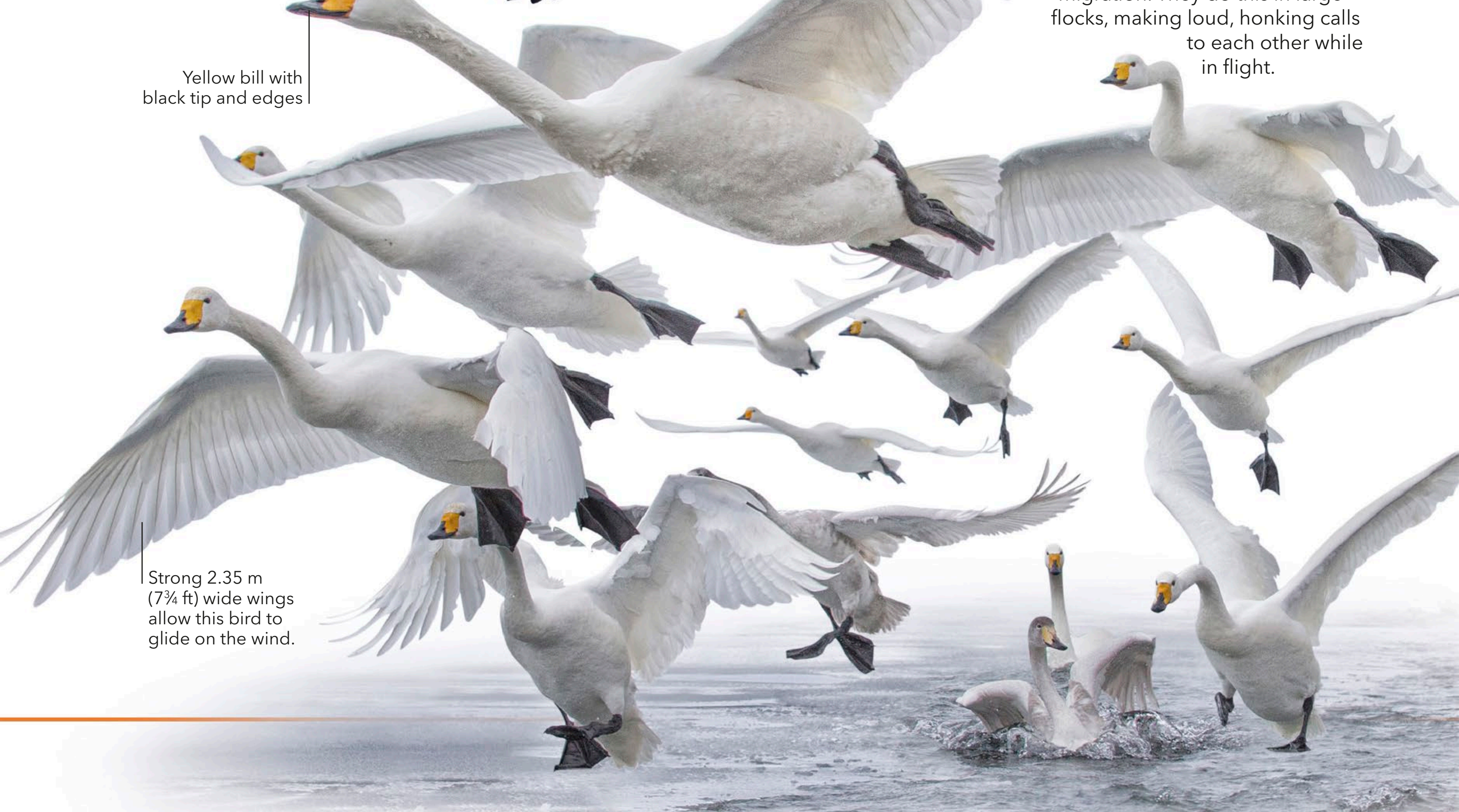
⑩ Tree holes are the perfect nesting place for this bird. It feeds by filtering water through its beak, or searches for acorns and berries on land.



⑪ Big and bulky, this bird weighs up to 3.3 kg (7¼ lb). It has a sharp, honking call and usually stays in large, noisy flocks.


Crest lies flat when bird is in flight.
Males have a distinctive black-and-white colouring.

⑫ This shy and uncommon bird breeds by lakes and rivers. Males and females both have crests, but otherwise look quite different. The female is grey with a dark brown head.


Yellow bill with black tip and edges
Strong 2.35 m (7¾ ft) wide wings allow this bird to glide on the wind.

⑬ Very strong fliers, these birds travel hundreds of kilometres on their annual migration. They do this in large flocks, making loud, honking calls to each other while in flight.

TEST YOURSELF

STARTER

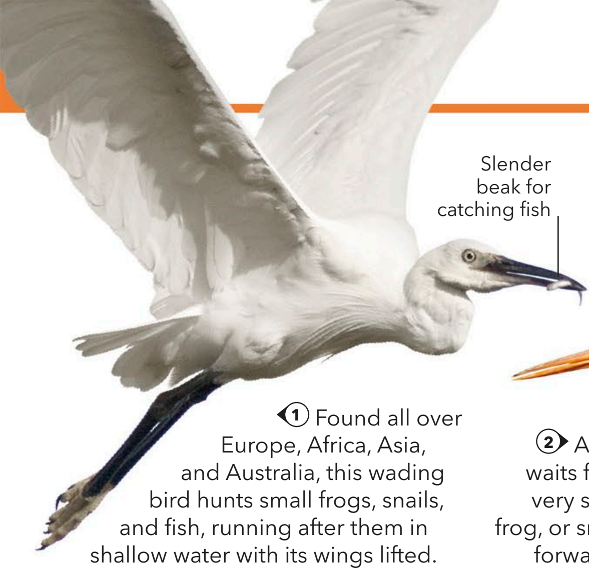
Black swan
Tufted duck
Mallard
Mandarin duck

CHALLENGER

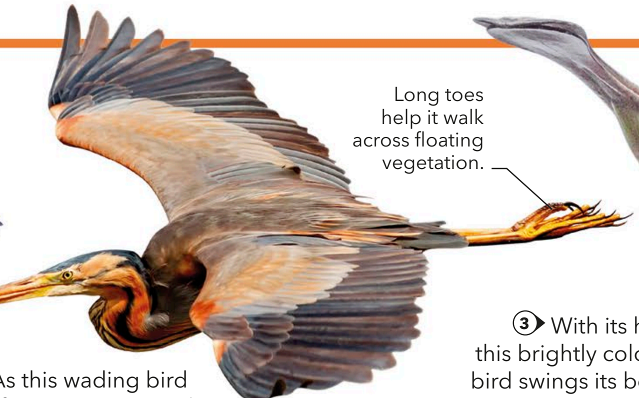
Whooper swan
Common shelduck
Greylag goose
Canada goose
Northern shoveler

GENIUS!

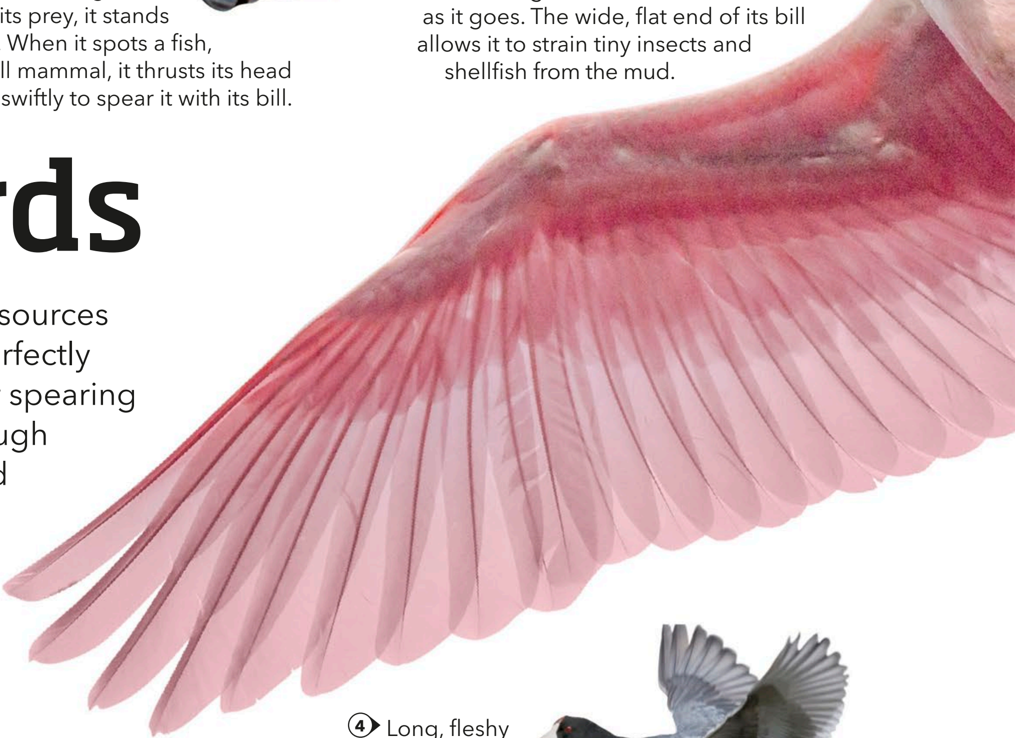
Wood duck
King eider
Ringed teal
Smew


Slender beak for catching fish

① Found all over Europe, Africa, Asia, and Australia, this wading bird hunts small frogs, snails, and fish, running after them in shallow water with its wings lifted.


Long toes help it walk across floating vegetation.

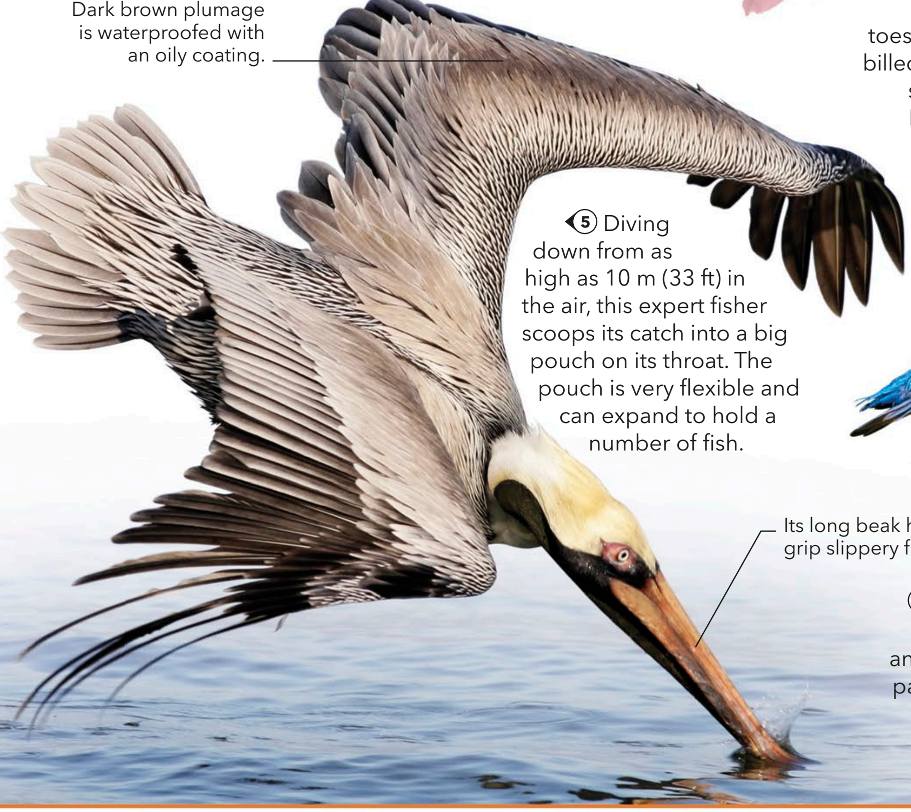
② As this wading bird waits for its prey, it stands very still. When it spots a fish, frog, or small mammal, it thrusts its head forward swiftly to spear it with its bill.


Narrow but elastic throat expands to swallow larger prey whole.

③ With its head down, this brightly coloured American bird swings its beak around in the water as it goes. The wide, flat end of its bill allows it to strain tiny insects and shellfish from the mud.

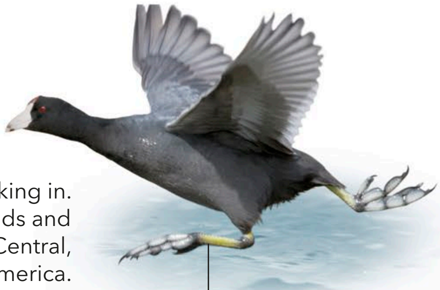
Water birds

Lakes, ponds, rivers, and streams are sources of food for several birds. Many are perfectly adapted to catch fish, scooping up or spearing their slippery prey. Others wade through shallow waters looking for insects and shellfish, or forage for plants growing alongside the water.

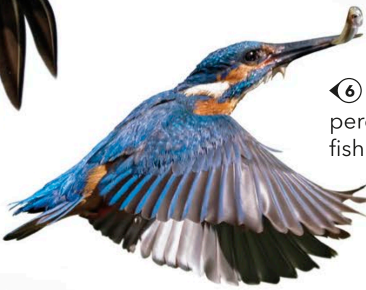

Dark brown plumage is waterproofed with an oily coating.

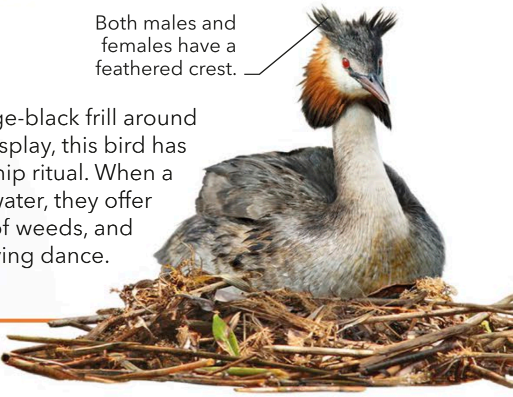
⑤ Diving down from as high as 10 m (33 ft) in the air, this expert fisher scoops its catch into a big pouch on its throat. The pouch is very flexible and can expand to hold a number of fish.

Its long beak helps grip slippery fish.


④ Long, fleshy toes enable this white-billed bird to walk across soft mud without sinking in. It is found in the ponds and marshes of North, Central, and South America.

Yellow legs


⑥ This colourful bird sits on a perch by the water, waiting for fish to swim by. As soon as one appears, the bird swoops down to snatch it up with its slender, sharp bill.


Both males and females have a feathered crest.

⑦ With the orange-black frill around its throat in full display, this bird has an elaborate courtship ritual. When a pair dives into the water, they offer each other gifts of weeds, and do a gentle, swaying dance.

ANSWERS: 1. Little egret 2. Purple heron 3. Roseate spoonbill 4. American coot 5. Brown pelican 6. Common kingfisher 7. Great crested grebe 8. European white stork 9. Scarlet ibis 10. Grey crowned crane 11. Eurasian bittern 12. Common moorhen 13. Great flamingo

Long toes spread the bird's weight on soft mud.

The long, narrow bill clatters when it communicates.

8 Found in Africa and Europe, this bird eats small frogs, rodents, and grasshoppers. It builds big, bulky nests in trees or high up on buildings in cities.

Its sensitive bill is used to search for food in the mud.

9 The national bird of Trinidad, this tropical wader gets its bright red colour from the tiny shellfish it eats.

Black-tipped wings

Red wattle under chin

Stiff, golden crown of feathers on the head

10 This African bird forages for seeds, insects, and lizards on the ground. It courts a mate by leaping into the air, flapping its wings, and bowing its head.

11 Streaky feathers are the perfect camouflage for this bird, which lives in reed beds. Often heard during the mating season, its call sounds like a loud "boom"!

12 With large yellow feet and a yellow-tipped red beak, this bird is a familiar sight in wetlands and even cities all over the world.

The broad, angled bill sifts food from the surface of the water.

13 Wading in shallow water in large flocks, this bird can be up to 1.5 m (5 ft) tall. To feed on insects and shrimps, it lowers its exceptionally long neck and turns its head upside down.

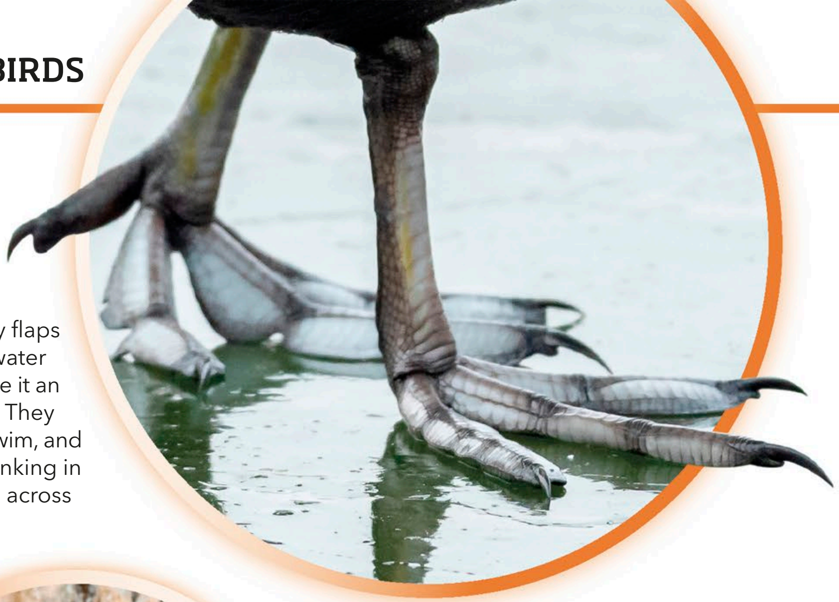
Long legs allow it to search for food in deeper water.

TEST YOURSELF

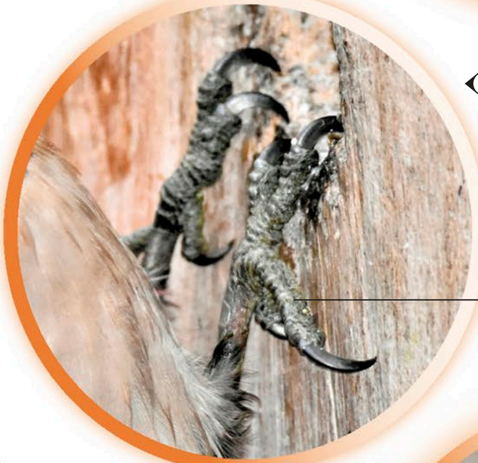
STARTER	CHALLENGER	GENIUS!
Greater flamingo	**Great crested grebe**	**Purple heron**
Common kingfisher	**Common moorhen**	**American coot**
Brown pelican	**Grey crowned crane**	**Eurasian bittern**
Scarlet ibis	**European white stork**	**Little egret**
Roseate spoonbill		

Clever claws

All birds have legs, but the shape and look of them can be very different. Birds that spend most of their time flying have such small, weak legs that they find walking difficult when on the ground. Water birds often have webbed toes for swimming, and birds of prey have razor-sharp talons for hunting. Can you identify these birds from their legs and feet?

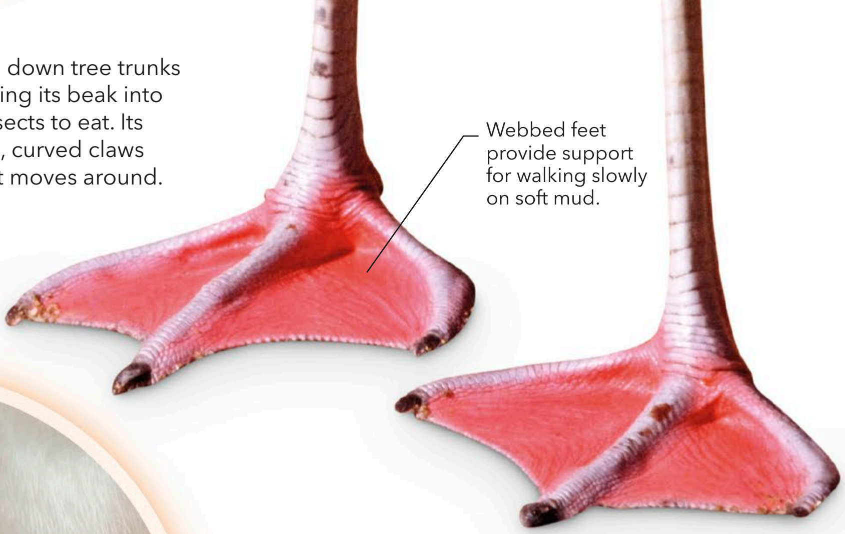


① The fleshy flaps on this freshwater bird's feet give it an ungainly gait. They also help it swim, and stop it from sinking in when it walks across wet mud.



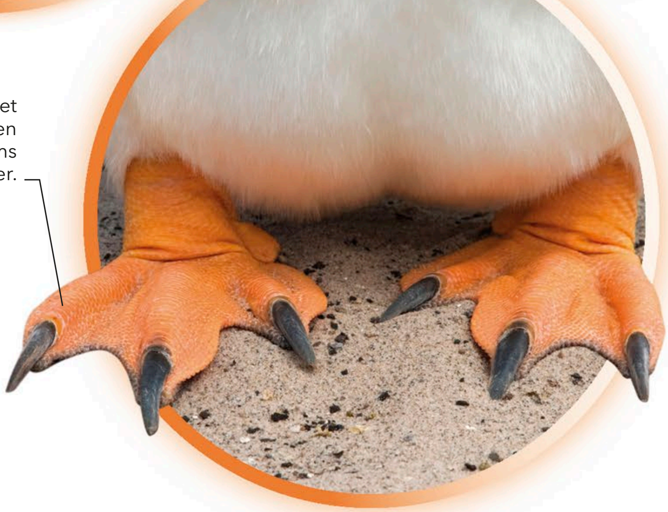
② This bird runs up and down tree trunks and branches, hammering its beak into the bark to look for insects to eat. Its strong feet and sharp, curved claws give it a firm grip as it moves around.

Two toes point backwards and two forwards.



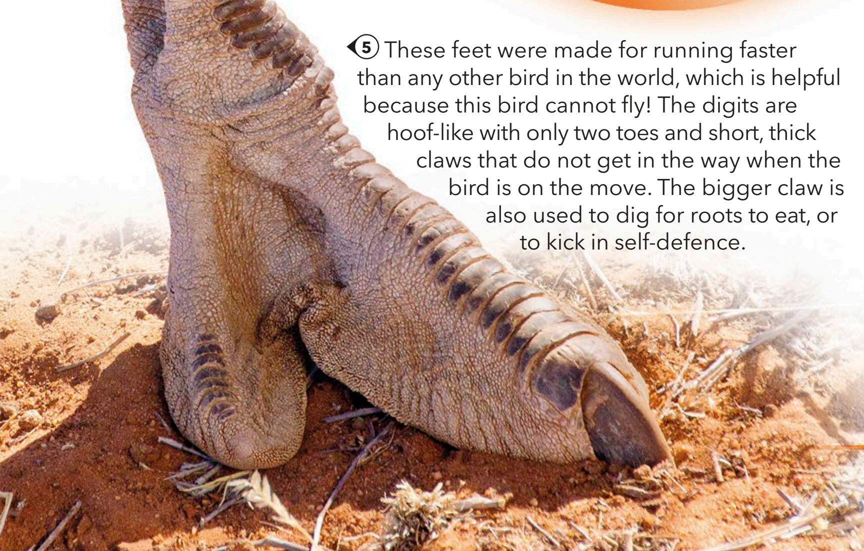
③ Long legs help this brightly coloured bird keep its body dry while it wades through water searching for food. It can stand balanced on just one leg for up to four hours at a time.

Webbed feet provide support for walking slowly on soft mud.



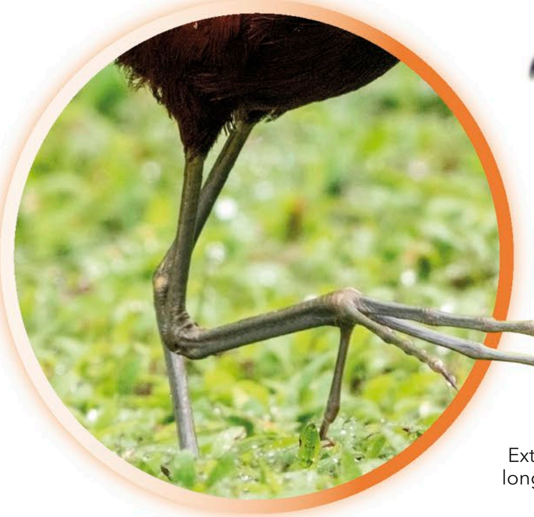
④ This bird lives in a habitat that is so cold its feet risk freezing. The chilled blood flowing up its legs picks up heat from the warm blood flowing down to its feet. This in turn cools the blood going to the feet and keeps the loss of body heat to a minimum.

Wide, webbed feet help steer when the bird swims under water.



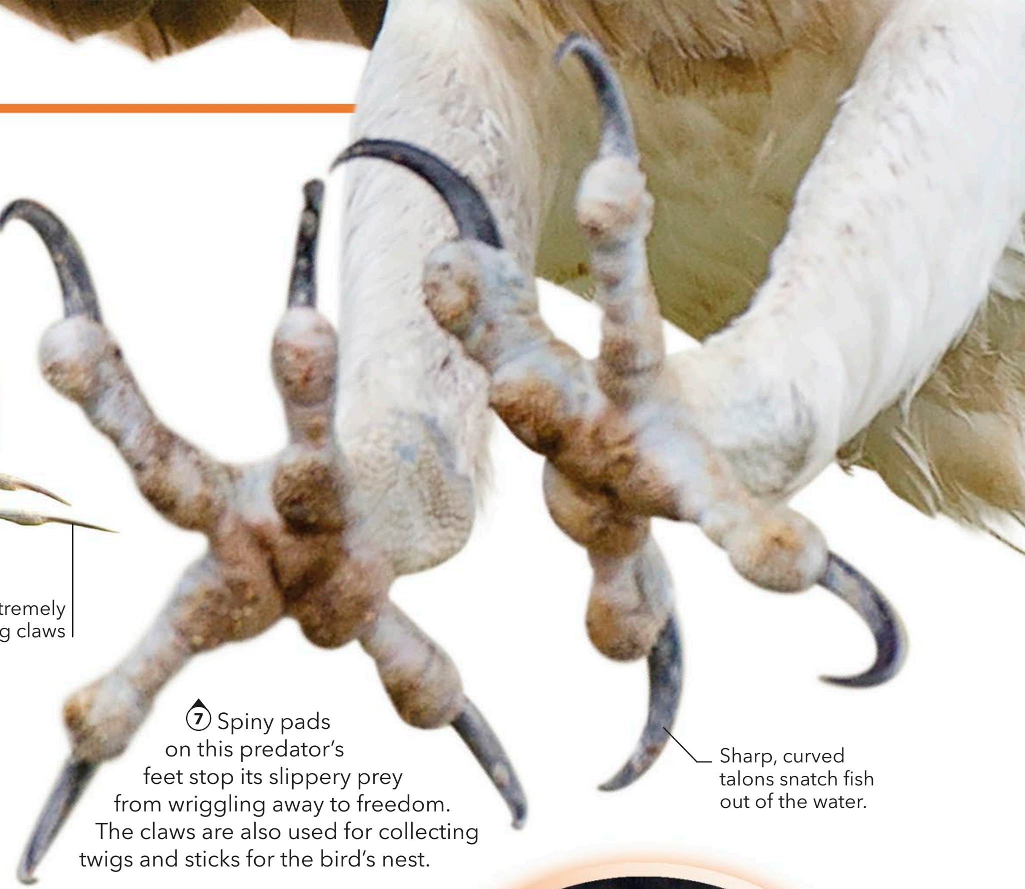
⑤ These feet were made for running faster than any other bird in the world, which is helpful because this bird cannot fly! The digits are hoof-like with only two toes and short, thick claws that do not get in the way when the bird is on the move. The bigger claw is also used to dig for roots to eat, or to kick in self-defence.

ANSWERS: 1. Common coot 2. Great spotted woodpecker 3. Chilean flamingo 4. Gentoo penguin 5. Ostrich 6. Northern jacana 7. Osprey 8. American crow 9. Blue-footed booby 10. Tawny owl



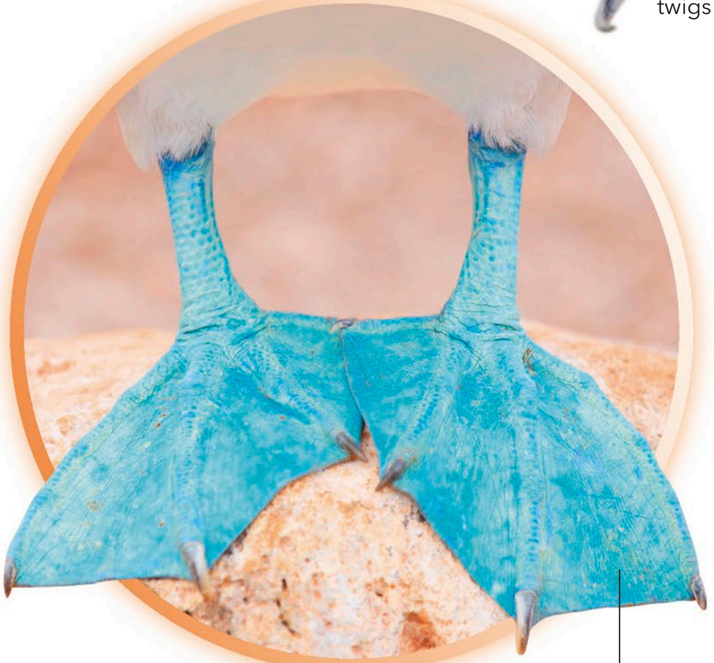
Extremely long claws

⑥ A huge toe span allows this North American shorebird to spread its weight over a wide area. This enables it to walk across thin layers of floating water plants.



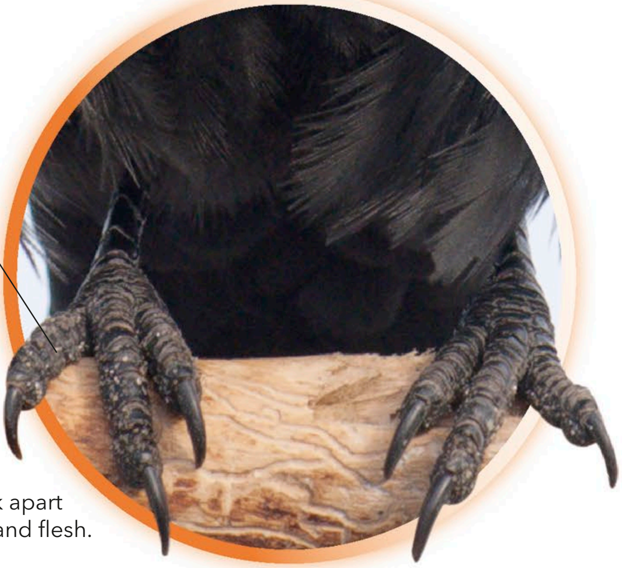
⑦ Spiny pads on this predator's feet stop its slippery prey from wriggling away to freedom. The claws are also used for collecting twigs and sticks for the bird's nest.

Sharp, curved talons snatch fish out of the water.



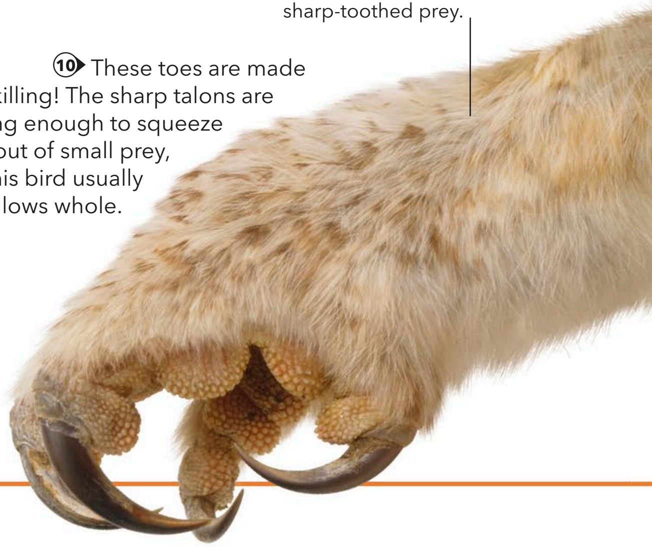
⑨ Webbing between the toes makes this bird's feet act like paddles, pushing it quickly through water. They are also used to cover its young, keeping them warm.

Males waggle and stomp their brightly coloured feet to attract a mate.



Long toes have a good grip for perching.

⑧ This familiar black bird is an omnivore – it eats plants as well as other animals – and uses its strong feet and claws to pick apart fruit and flesh.



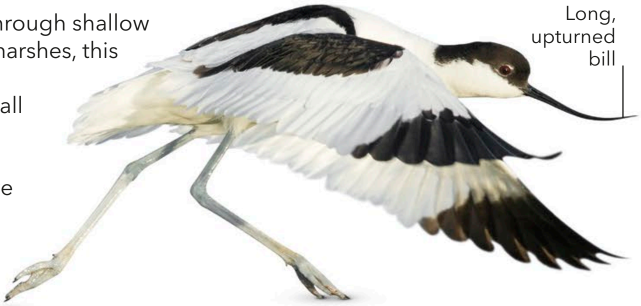
Feathers on the legs and feet protect against sharp-toothed prey.

⑩ These toes are made for killing! The sharp talons are strong enough to squeeze the life out of small prey, which this bird usually swallows whole.

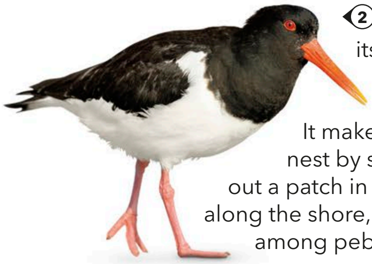
TEST YOURSELF

STARTER	**CHALLENGER**	**GENIUS!**
Ostrich	**Tawny owl**	**Northern jacana**
Blue-footed booby	**American crow**	**Common coot**
Chilean flamingo	**Great spotted woodpecker**	**Osprey**
Gentoo penguin		

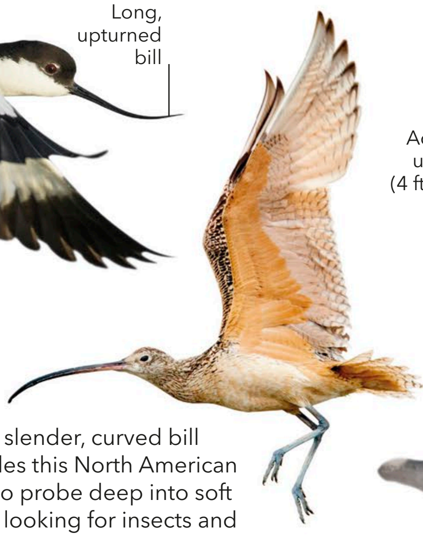
① Wading through shallow saline (salty) marshes, this black-capped bird hunts small animals by sweeping its super-sensitive bill from side to side in the water.



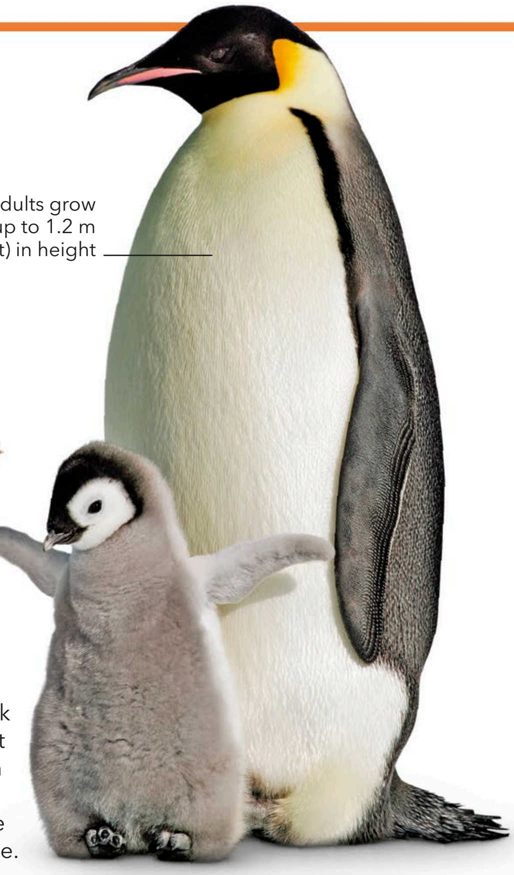
② This bird uses its strong, orange beak to prise open shellfish. It makes a very basic nest by simply scraping out a patch in the ground along the shore, often among pebbles.



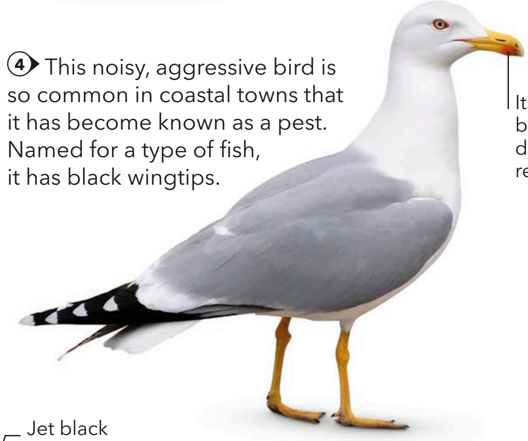
③ A slender, curved bill enables this North American bird to probe deep into soft mud, looking for insects and shellfish. Its flight song is made up of trills and whistles.



⑤ With wings that work like flippers, this expert swimmer feeds on small fish in the icy waters around Antarctica. It breeds in huge colonies on the Antarctic ice.

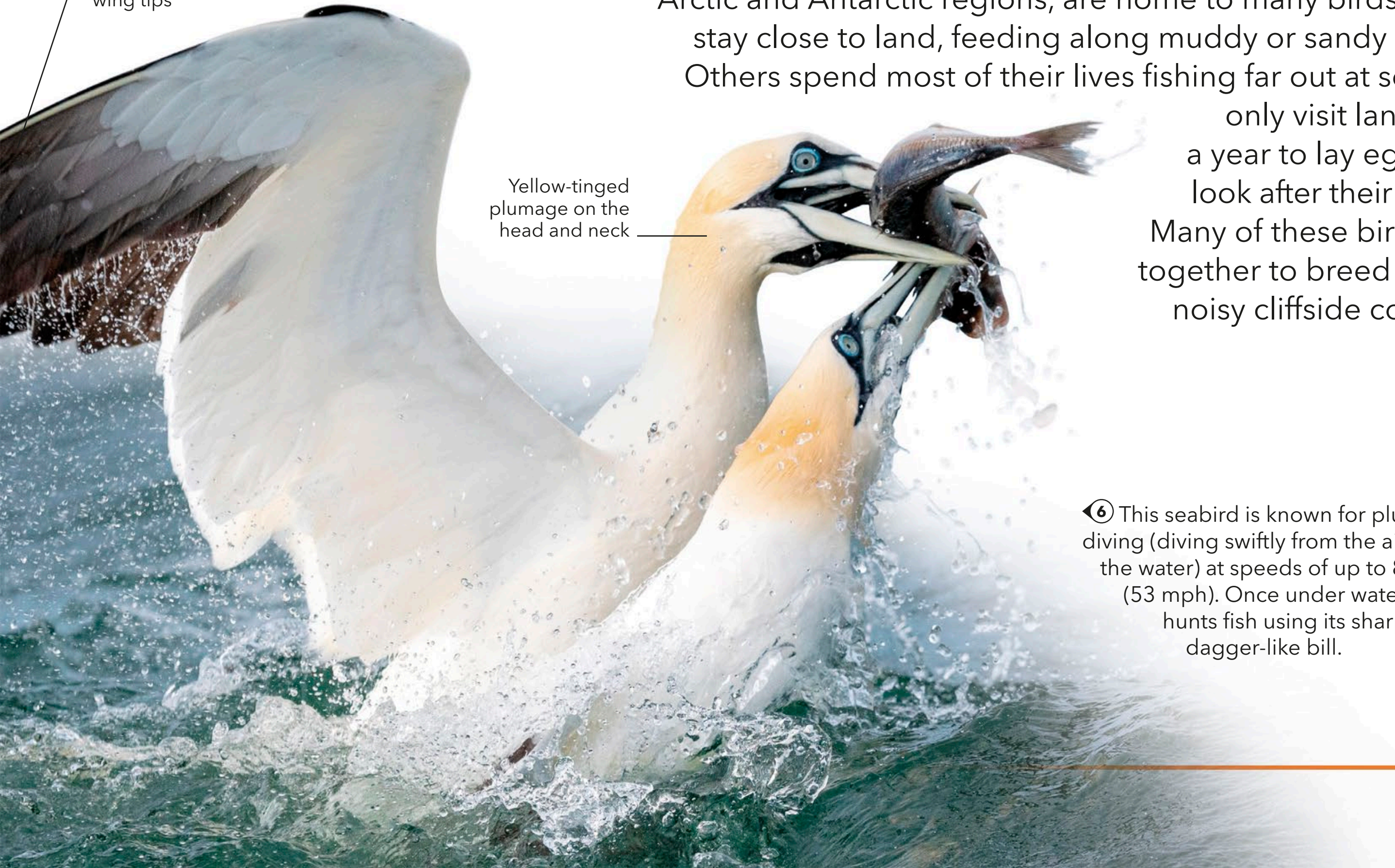


④ This noisy, aggressive bird is so common in coastal towns that it has become known as a pest. Named for a type of fish, it has black wingtips.



Coastal birds

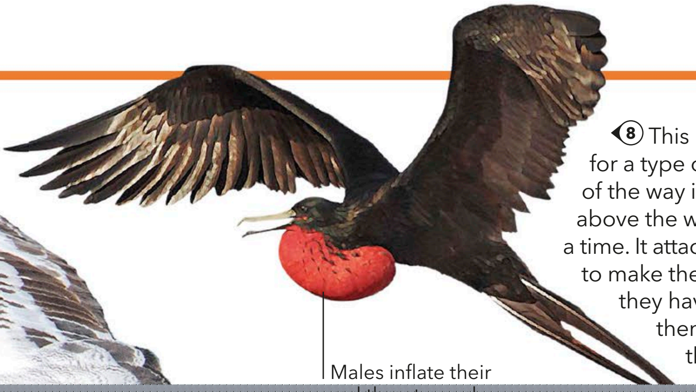
Coastlines across the world, including those in the frozen Arctic and Antarctic regions, are home to many birds. Some stay close to land, feeding along muddy or sandy shores. Others spend most of their lives fishing far out at sea, and only visit land once a year to lay eggs and look after their young. Many of these birds nest together to breed in vast, noisy cliffside colonies.



⑥ This seabird is known for plunge-diving (diving swiftly from the air into the water) at speeds of up to 86 km/h (53 mph). Once under water, it hunts fish using its sharp, dagger-like bill.

Long, narrow wings help it glide on ocean breezes, conserving energy for a long flight.

⑦ This seabird flies more than 96,000 km (59,650 miles) every year from the Arctic Circle to Antarctica and back, making the longest migration among all birds.



⑧ This bird was named for a type of ship, because of the way it often soars above the waves for days at a time. It attacks other seabirds to make them cough up fish they have caught – and then consumes the fish.

Males inflate their red throat pouch to attract a mate.

TEST YOURSELF

STARTER

Red-throated diver
Atlantic puffin
Emperor penguin
Wandering albatross
Herring gull

CHALLENGER

Magnificent frigatebird
Arctic tern
Rockhopper penguin
Eurasian oystercatcher
Great cormorant

GENIUS!

Northern lapwing
Northern gannet
Pied avocet
Long-billed curlew

⑨ This master soarer has a wingspan of up to 3.5 m (11 ft) – the largest of all birds. It flies low over the icy Antarctic Ocean to snatch small fish, squid, and krill from just below the surface.

⑩ Also known as the "clown of the sea" for its comic waddle, this bird uses its muscular wings to dive deep into the water for food. Its colourful bill can hold more than ten small fish at once!

Black cap and crest

⑪ This clever bird tries to tempt predators away from its nest by pretending to have a broken wing. It is also known as a peewit after the sound of its call.

Long, webbed toes

Spiky crest of yellow and black feathers

Red throat

⑫ Rarely seen on land, this European bird can stay under water for more than a minute chasing fish. It holds its slender, sharp bill at an upturned angle while swimming and flying.

Long flight feathers

Wings must be spread out to dry, as the feathers are not waterproof.

⑬ This bird jumps to move from one spot to another, rather than waddling. It lives on the shores of islands in the Antarctic Ocean and shrieks loudly to defend its territory.

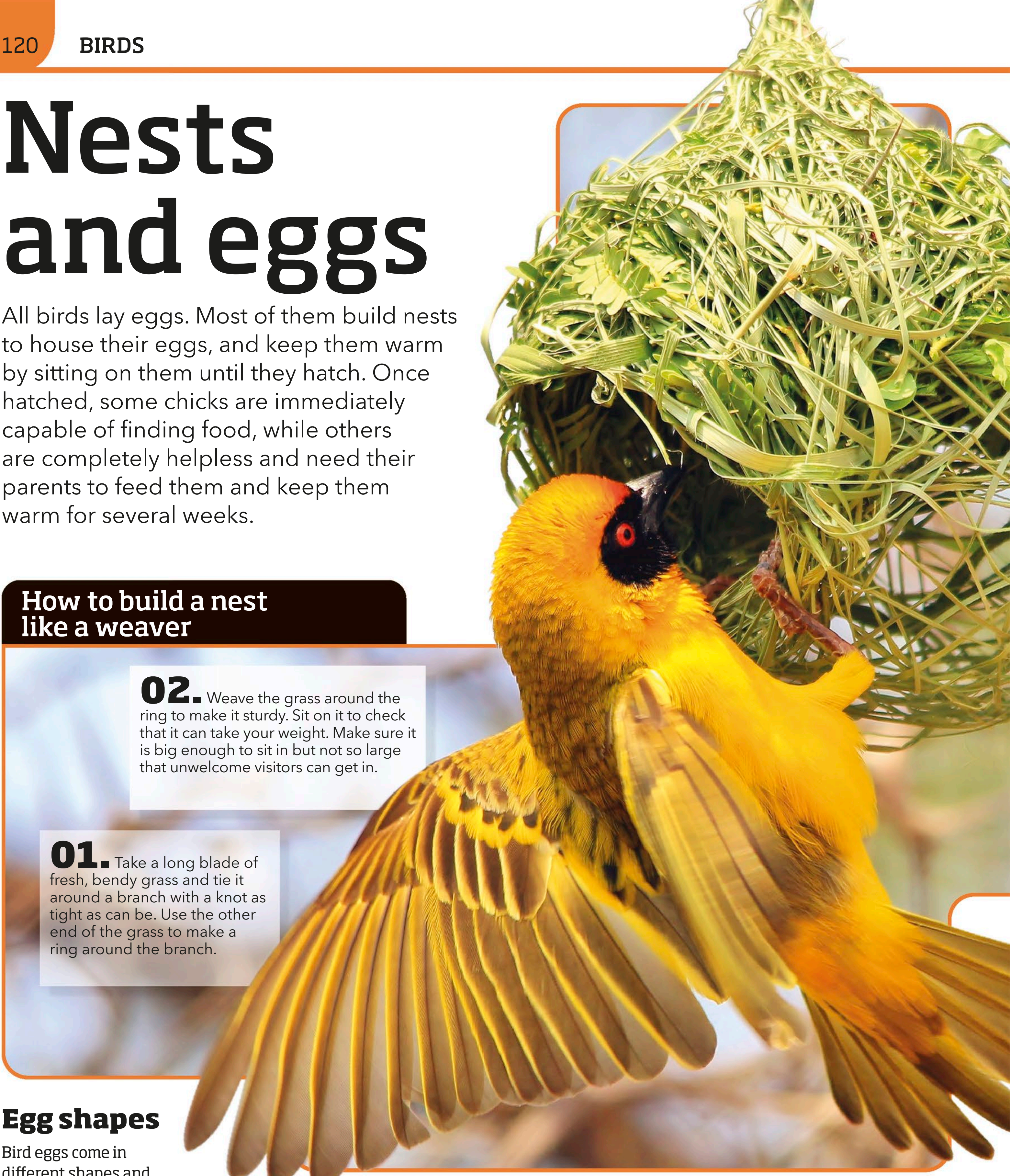
⑭ Found in almost all continents, this long-necked bird can dive down to 30 m (100 ft) under the surface of water in pursuit of fish.

ANSWERS: 1. Pied avocet 2. Eurasian oystercatcher 3. Long-billed curlew 4. Herring gull 5. Emperor penguin 6. Northern gannet 7. Arctic tern 8. Magnificent frigatebird 9. Wandering albatross 10. Atlantic puffin 11. Northern lapwing 12. Red-throated diver 13. Rockhopper penguin 14. Great cormorant

Nests and eggs

All birds lay eggs. Most of them build nests to house their eggs, and keep them warm by sitting on them until they hatch. Once hatched, some chicks are immediately capable of finding food, while others are completely helpless and need their parents to feed them and keep them warm for several weeks.

How to build a nest like a weaver

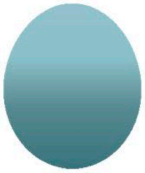


01. Take a long blade of fresh, bendy grass and tie it around a branch with a knot as tight as can be. Use the other end of the grass to make a ring around the branch.

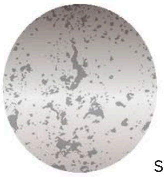
02. Weave the grass around the ring to make it sturdy. Sit on it to check that it can take your weight. Make sure it is big enough to sit in but not so large that unwelcome visitors can get in.

Egg shapes

Bird eggs come in different shapes and sizes. Some experts think that an egg's shape is linked to how much its parents fly – birds that fly long distances have sleek bodies and so lay narrow eggs.

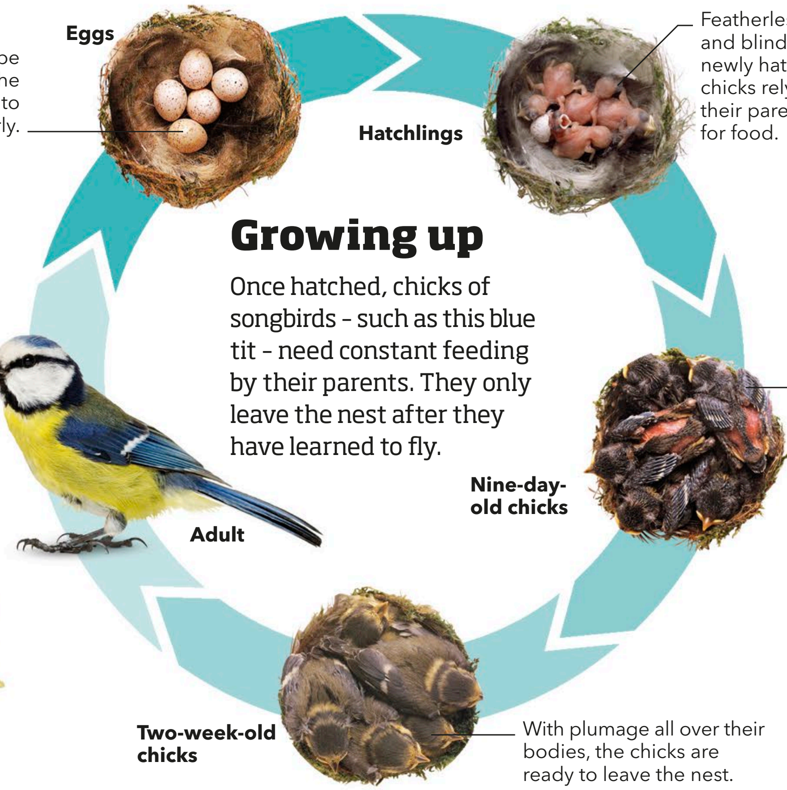


Oval
This is the most common shape of eggs among birds.



Near-spherical
Eggs of this shape are usually laid by birds that fly for short distances.

Conical
Birds that fly a lot tend to lay longer, more conical eggs.



Eggs need to be kept warm for the chicks inside to develop properly.

Featherless and blind, the newly hatched chicks rely on their parents for food.

Feathers begin to grow, and the chicks' eyes open.

With plumage all over their bodies, the chicks are ready to leave the nest.

Growing up

Once hatched, chicks of songbirds – such as this blue tit – need constant feeding by their parents. They only leave the nest after they have learned to fly.

I don't believe it!

The bee hummingbird builds the world's smallest nest, which is only around 2.5 cm (1 in) wide – shorter than an average paperclip!

Moving into town

White storks are often found in urban areas in central Europe. They build massive nests on top of tall buildings or lamp-posts.

03. Weave a roof over the ring. Let your potential mate inspect it, and if she approves, finish weaving the nest till it is strong enough to hold the eggs.

Nesting colonies

Some birds nest together in colonies to reduce the risk of an attack by predators. King penguin colonies can contain hundreds of thousands of birds.

Amazing nests

Long-tailed tits build bottle-shaped nests using spiderwebs, lichen, and feathers. As the chicks grow bigger, the nest stretches to accommodate them.

Bee-eaters use their beaks and feet to dig burrows in sandbanks. These burrows can be up to 1 m (3 ft) deep, and end in a nesting chamber.

House martins often build their nests along the edges of buildings. They layer beakfuls of wet mud on top of each other, letting the mud dry out and harden to form a nest.

7

MAMMALS

Bathing buddies
There are more than 6,000 species of mammals on the planet. Some, like these giraffes, zebras, and antelopes, live in perfect harmony. At Etosha National Park in Namibia, they are regularly seen together, drinking or bathing in a watering hole.

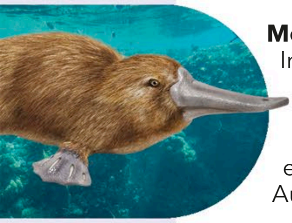
Mammals

Found in every habitat on Earth, mammals are vertebrates (animals with a backbone) and are warm blooded – they can generate body heat from the food they eat. They include an array of creatures, from tiny shrews to huge whales. Most mammals have hair for warmth, and nearly all bear live young that feed on their mother's milk.

Types of mammals

Placentals
There are just three groups of mammals, and the majority are placental mammals. These give birth to babies that have developed inside the mother's body, nourished by an organ called a placenta.

Marsupials
The animals in this group are born before being fully developed. Until they are fully formed, they live in a pouch on the mother's body, and feed on milk.



Monotremes
Instead of giving birth to live young, platypuses and echidnas – which make up this group – lay eggs. They are all found in Australia and New Guinea.

How to parent like a monkey

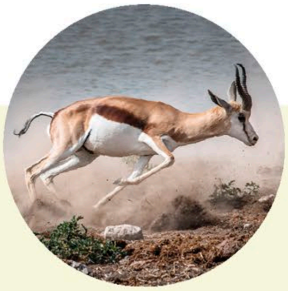
01. Hold your baby tightly in your arms to keep it safe as you leap through the trees.

02. Feed your baby regularly on milk throughout its first year.

Mammal moves

Mammals can move in many ways. Here are some of their main ways to get about.

Walk: During a drought, rhinos can walk for up to 16 km (10 miles) to find water.



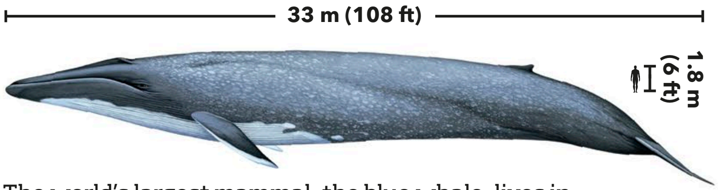
Run: Among the fastest mammals, springboks can run at a speed of up to 88 km/h (55 mph).

Hop: Kangaroo rats may be small, but they can jump up to 2.75 m (9 ft) high.

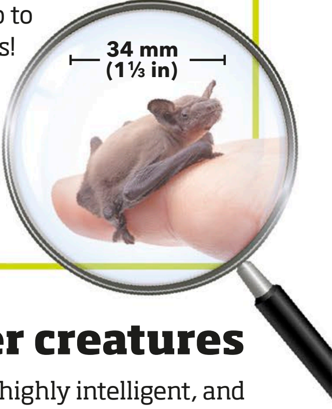
Climb: Red squirrels use their sharp claws and powerful legs to climb trees.

03. Kiss the baby to keep it happy, but tell it off when it is naughty. When it is old enough, teach it how to find its own food, and how to call out to its friends.

Biggest and smallest



The world's largest mammal, the blue whale, lives in all oceans except the Arctic. It can weigh up to 200 tonnes – heavier than 25 adult elephants!



Found in caves in parts of Thailand and Myanmar, the Kitti's hog-nosed bat is the world's smallest mammal – slightly bigger than a bumblebee.

I don't believe it!

Goats may not look like great climbers but some of them can scale near-vertical cliffs using their tough, clasping hooves to grip tiny crevices.

Clever creatures

Raccoons are highly intelligent, and can use their hands with great skill to open doors and locks, take the lids off jars, and break into bird feeders.

In numbers

30,000
The number of ants and termites a giant anteater can eat in a day.

22
The number of hours a koala can sleep at a stretch.

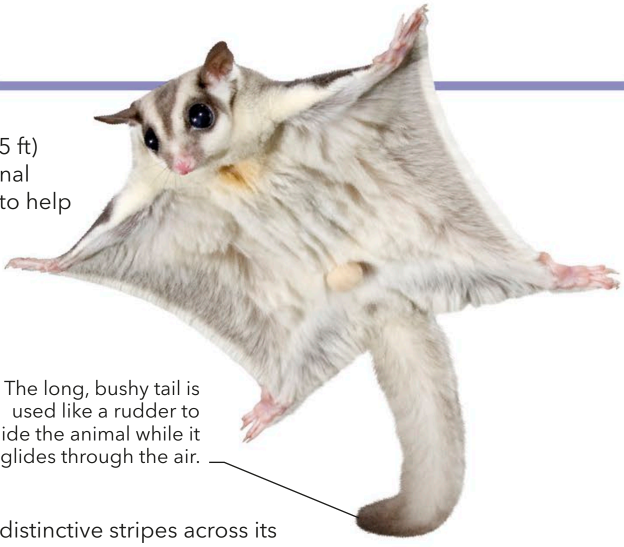
8 km
(5 miles) The distance from which a lion's roar can be heard.

Fly: Bats, such as the flying fox, can fly at a speed of up to 40 km/h (25 mph).

Glide: Flying squirrels can glide a distance of up to 150 m (492 ft).

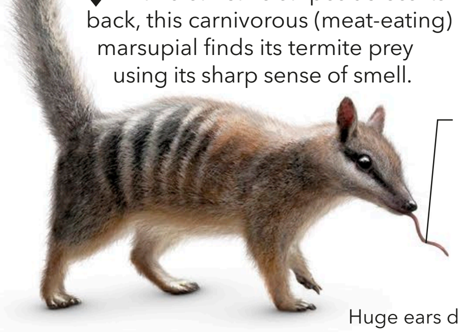
Swing: Gibbons use their long arms to swing from branch to branch.

Swim: The paddle-like flippers of whales enable them to swim with ease.



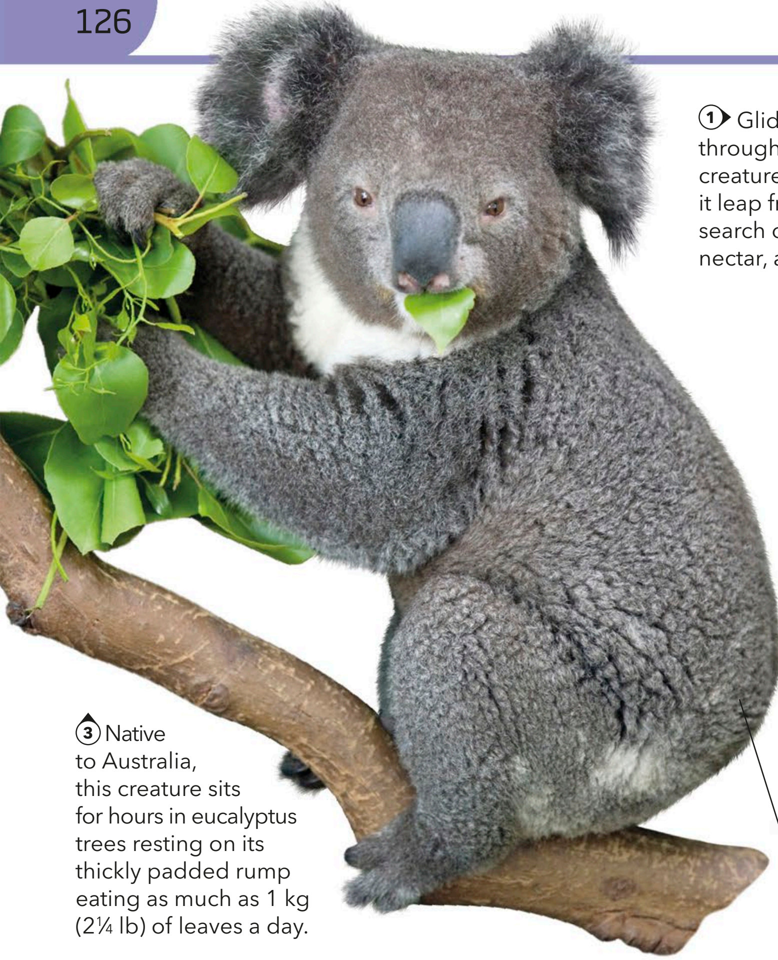
① Gliding up to 50 m (165 ft) through the air, this nocturnal creature uses its skin flaps to help it leap from tree to tree in search of sweet sap, nectar, and insects.

The long, bushy tail is used like a rudder to guide the animal while it glides through the air.



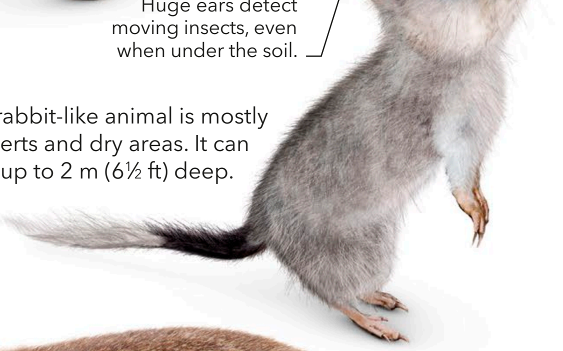
② With distinctive stripes across its back, this carnivorous (meat-eating) marsupial finds its termite prey using its sharp sense of smell.

Its long, sticky tongue helps suck up termites.



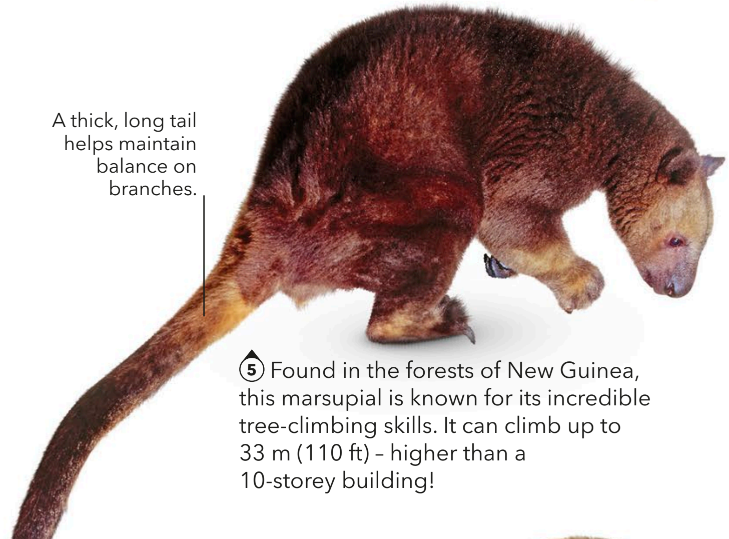
③ Native to Australia, this creature sits for hours in eucalyptus trees resting on its thickly padded rump eating as much as 1 kg (2¼ lb) of leaves a day.

Woolly fur repels rain water.



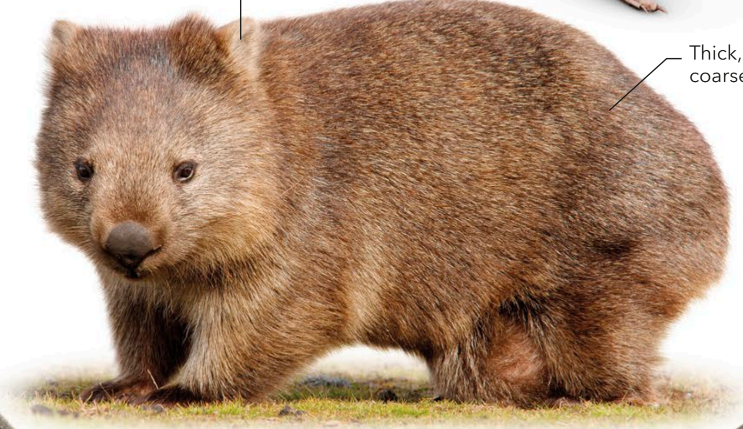
Huge ears detect moving insects, even when under the soil.

④ This rabbit-like animal is mostly found in deserts and dry areas. It can dig burrows up to 2 m (6½ ft) deep.



A thick, long tail helps maintain balance on branches.

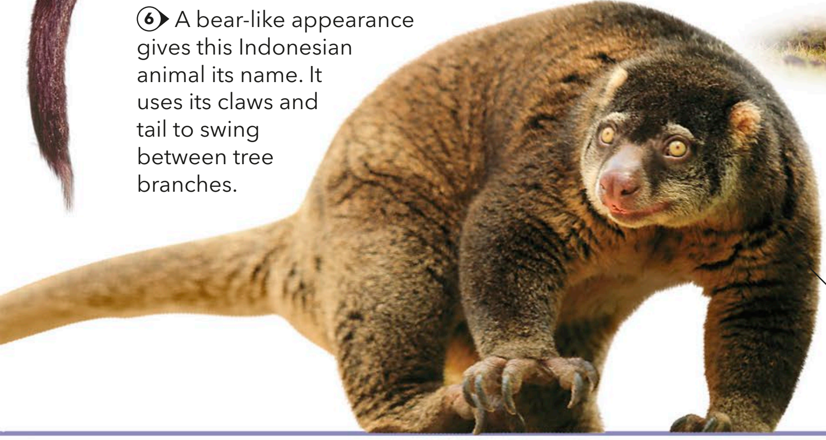
⑤ Found in the forests of New Guinea, this marsupial is known for its incredible tree-climbing skills. It can climb up to 33 m (110 ft) – higher than a 10-storey building!



Despite small ears, it has excellent hearing.

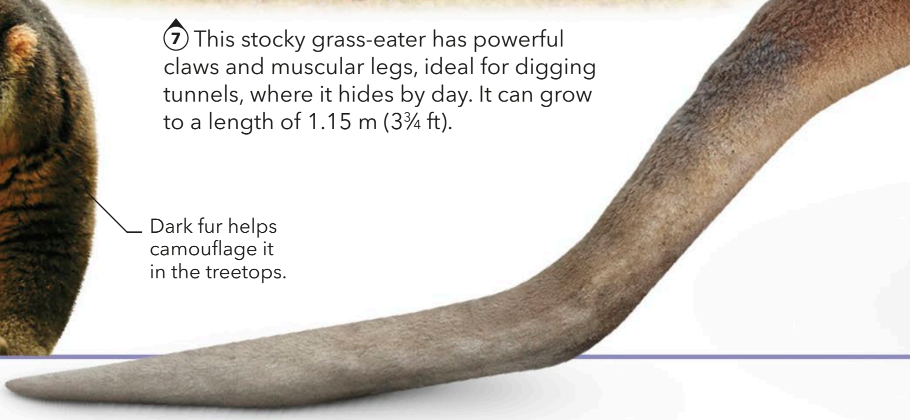
Thick, coarse fur

⑦ This stocky grass-eater has powerful claws and muscular legs, ideal for digging tunnels, where it hides by day. It can grow to a length of 1.15 m (3¾ ft).



⑥ A bear-like appearance gives this Indonesian animal its name. It uses its claws and tail to swing between tree branches.

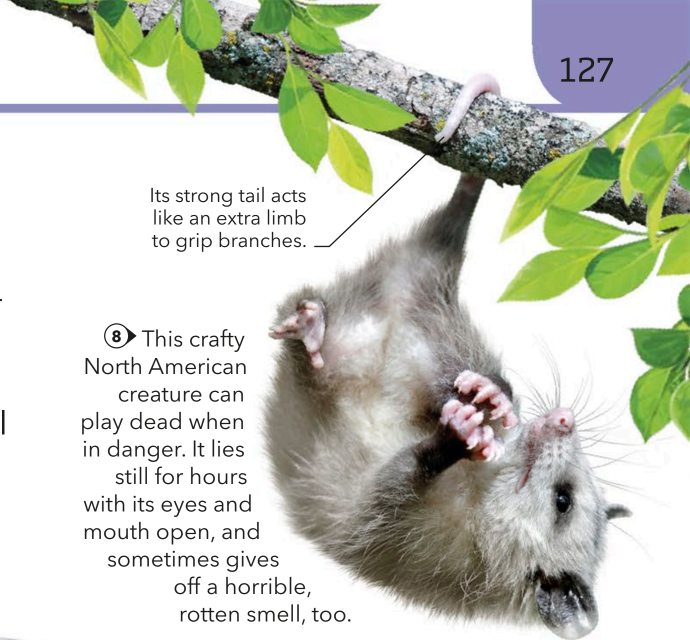
Dark fur helps camouflage it in the treetops.



ANSWERS: 1. Sugar glider 2. Numbat 3. Koala 4. Greater bilby 5. Doria's tree kangaroo 6. Sulawesi bear cuscus 7. Common wombat 8. Virginia opossum 9. Tasmanian devil 10. Red kangaroo 11. Slender-tailed dunnart

Marsupials

From sleepy leaf-eaters to powerful jumpers, marsupials – or pouched mammals – come in all shapes and sizes. They all nurture their young in a pouch or flap under the mother's skin. Here, the babies – known as joeys – are protected until they are ready to enter the world.



Its strong tail acts like an extra limb to grip branches.

⑧ This crafty North American creature can play dead when in danger. It lies still for hours with its eyes and mouth open, and sometimes gives off a horrible, rotten smell, too.

⑨ This aggressive nocturnal hunter, known for its wide gape, has one of the most powerful bites of any mammal.

Thick fur gives it protection from the Sun.

⑩ The largest of all marsupials, this mighty mammal can grow up to 2 m (6½ ft) tall from nose to tail, and can weigh around 90 kg (200 lb).

Powerful legs allow it to leap across more than 9 m (29½ ft) when making an escape.

Its muscular tail is used as an extra leg to propel it forward.

⑪ Also known as a narrow-footed marsupial mouse, this small animal grows up to 12 cm (4½ in) long and has a slim tail.

TEST YOURSELF

STARTER

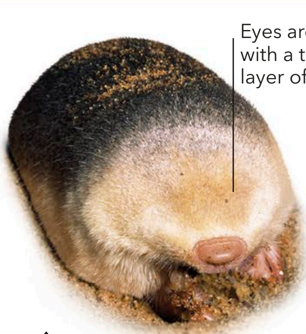
- Common wombat
- Red kangaroo
- Koala
- Tasmanian devil

CHALLENGER

- **Virginia opossum**
- **Sugar glider**
- **Doria's tree kangaroo**
- **Sulawesi bear cuscus**

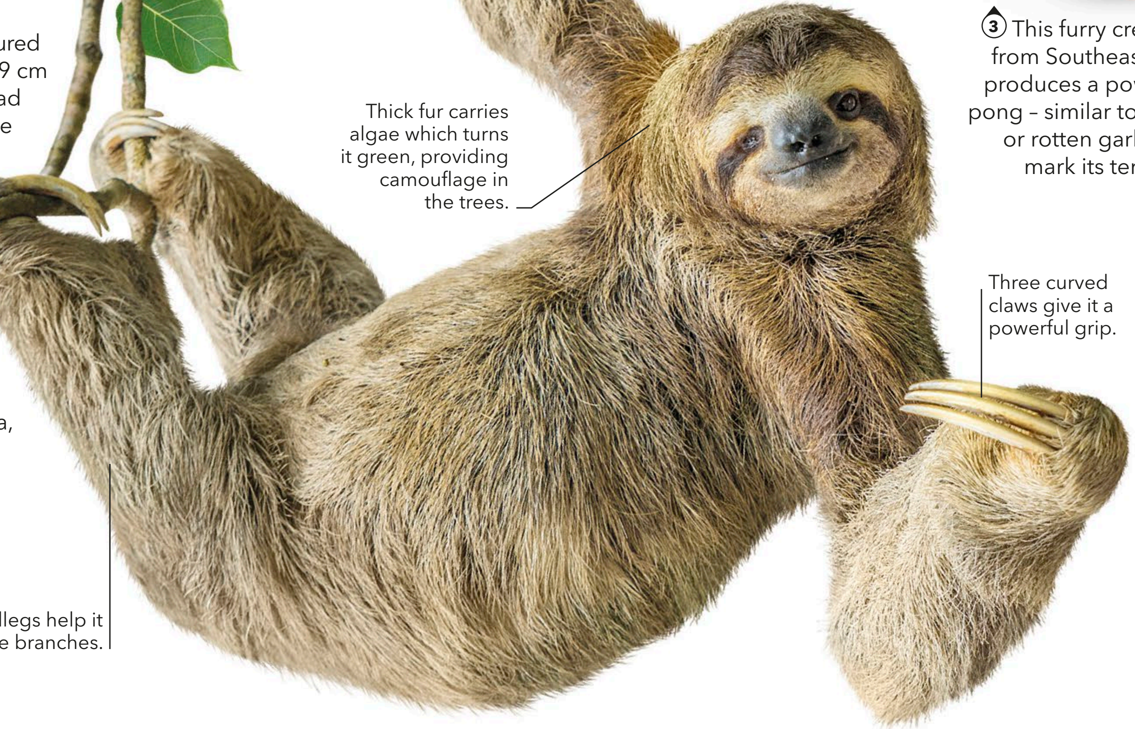
GENIUS!

- **Slender-tailed dunnart**
- **Numbat**
- **Greater bilby**



Eyes are covered with a thick layer of skin.

① Named for its light-coloured fur, this tiny animal is only 9 cm (3½ in) long. It uses its broad claws to "swim" through the sand of the Namib Desert in Africa.

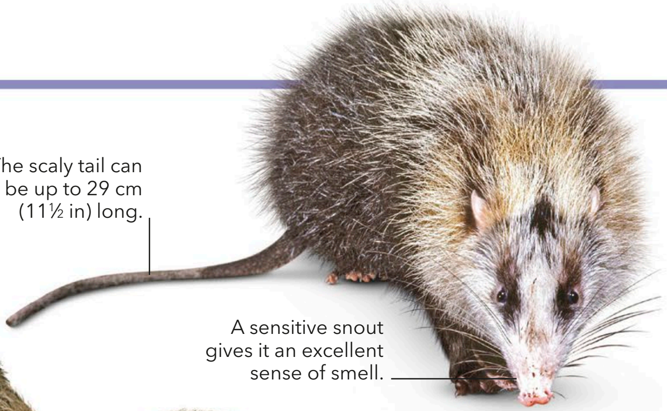


Thick fur carries algae which turns it green, providing camouflage in the trees.

Three curved claws give it a powerful grip.

② Living among the trees in the rainforests of Central and South America, this animal is believed to be the world's slowest-moving mammal.

Strong hindlegs help it hang from tree branches.



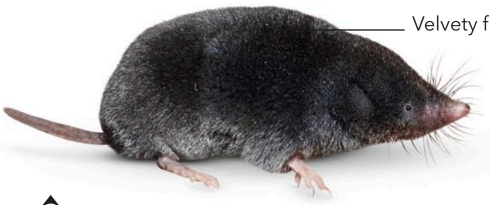
The scaly tail can be up to 29 cm (11½ in) long.

A sensitive snout gives it an excellent sense of smell.

③ This furry creature from Southeast Asia produces a powerful pong – similar to urine or rotten garlic – to mark its territory.

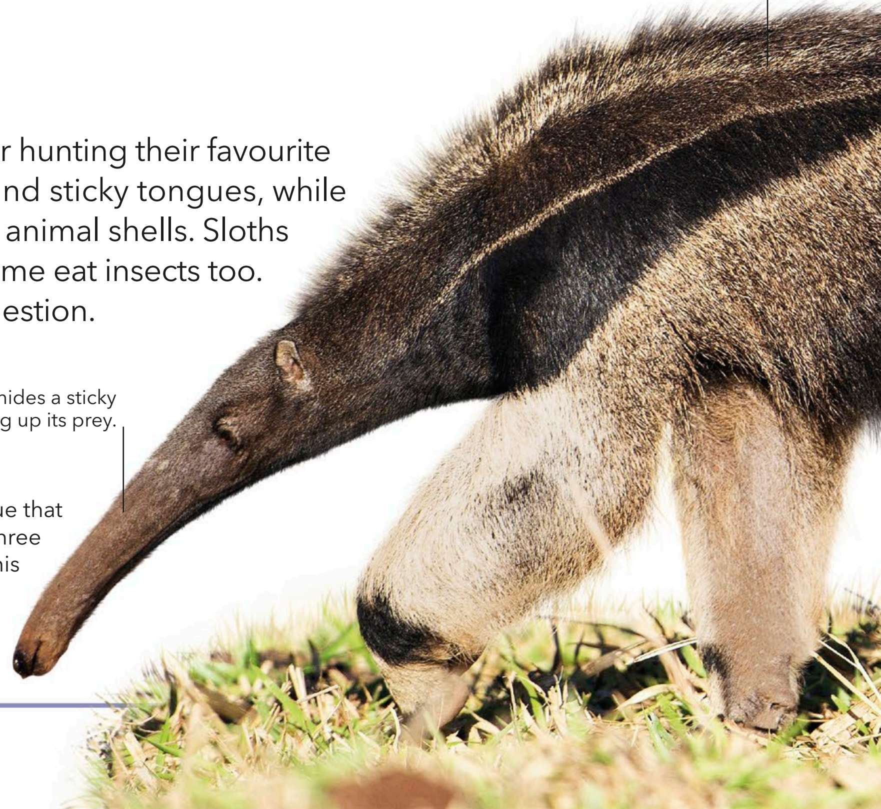
Insect eaters and sloths

Insect eaters have developed special features for hunting their favourite food – bugs. Some have long, pointed snouts and sticky tongues, while others have sharp teeth to crunch through hard animal shells. Sloths are mostly herbivores (plant eaters), although some eat insects too. They tend to be sluggish creatures with slow digestion.



Velvety fur

④ Named for its little tail, this creature spends most of its life underground. It uses its venomous saliva to paralyse its prey.



Short, bristly fur has black, brown, and white stripes.

Its long snout hides a sticky tongue for lapping up its prey.

⑤ With a tongue that can flick almost three times a second, this animal can eat lots of insects very quickly. It also has a keen sense of smell.

ANSWERS: 1. Grant's golden mole 2. Three-toed sloth 3. Moonrat 4. Northern short-tailed shrew 5. Giant anteater 6. European hedgehog 7. Star-nosed mole 8. Aardvark 9. Nine-banded armadillo 10. Lowland streaked tenrec

⑥ A gardener's best friend, this creature will eat up all the slugs in your vegetable patch! When threatened, it curls up into a prickly ball to deter predators.

Sensitive nose has more touch sensors than a human hand.

⑦ With eyes so small that it can barely see, this animal uses its nose and whiskers to detect prey, such as an earthworm, then gulps it down in less than a second.

⑧ This animal loves to feast on ants and termites. Its muscular body allows it to tunnel into the ground very quickly to find food, dig a burrow, or escape predators.

Large front claws help it dig into termite mounds.

⑨ Protected by its shell of tough, bony armour, this American creature is mostly found in forests and grasslands. It hunts by night and can sleep for up to 16 hours a day.

Plates growing in the skin protect it from predators.

Babies ride on their mother's back for up to one year.

⑩ Found in Madagascar, this striped animal is 19 cm (7½ in) long. When threatened, it uses its sharp spikes to defend itself.

A long, pointed snout helps it find food.

TEST YOURSELF

STARTER

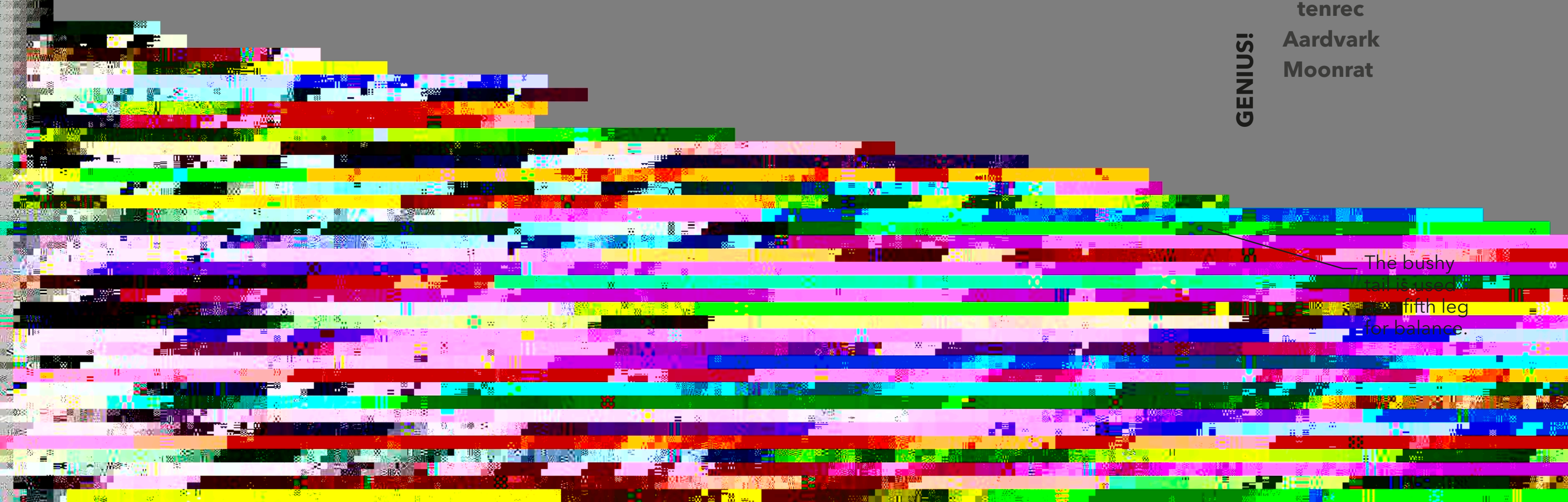
European hedgehog
Giant anteater
Three-toed sloth
Star-nosed mole

CHALLENGER

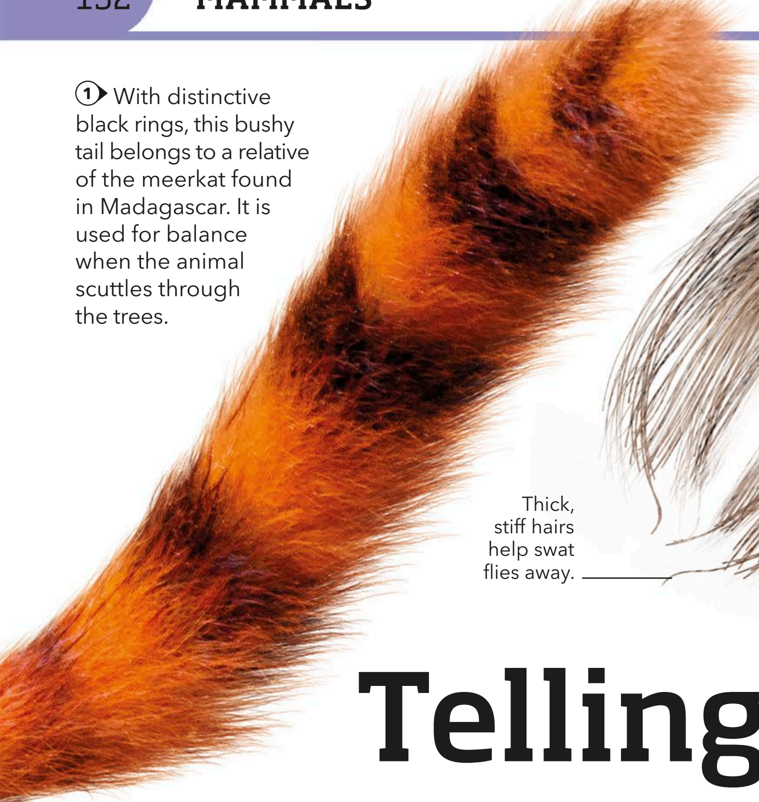
Northern short-tailed shrew
Grant's golden mole
Nine-banded armadillo

GENIUS!

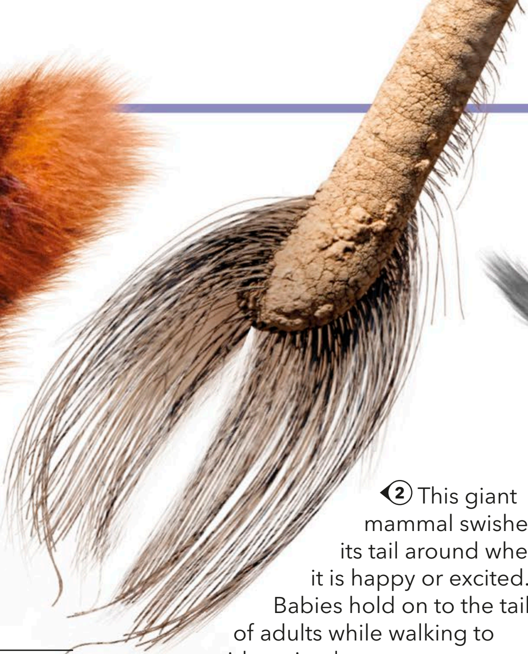
Lowland streaked tenrec
Aardvark
Moonrat



The bushy tail is used as a fifth leg for balance.

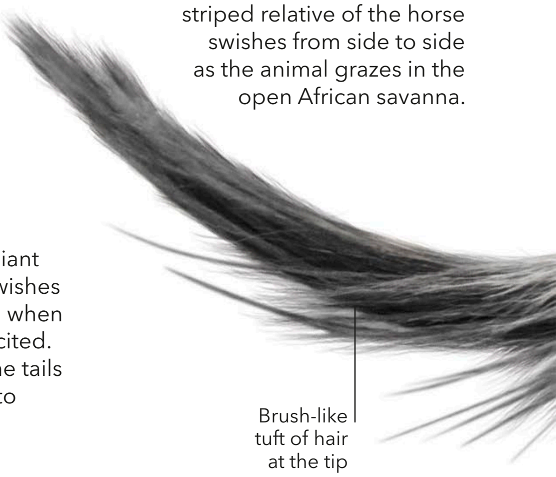


① With distinctive black rings, this bushy tail belongs to a relative of the meerkat found in Madagascar. It is used for balance when the animal scuttles through the trees.



② This giant mammal swishes its tail around when it is happy or excited. Babies hold on to the tails of adults while walking to avoid getting lost.

Thick, stiff hairs help swat flies away.

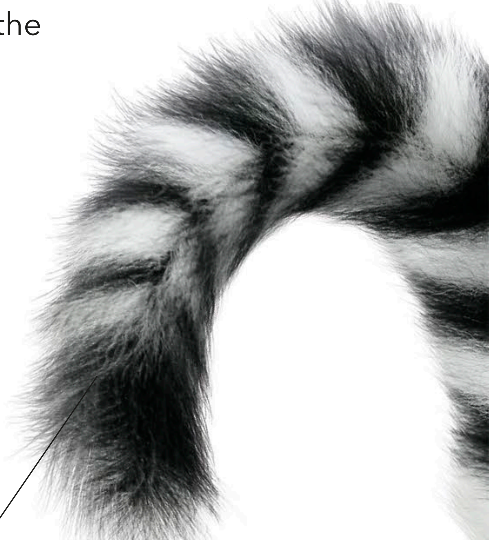


③ Used to swat away flies and other pesky bugs, the long, flexible tail of this striped relative of the horse swishes from side to side as the animal grazes in the open African savanna.

Brush-like tuft of hair at the tip

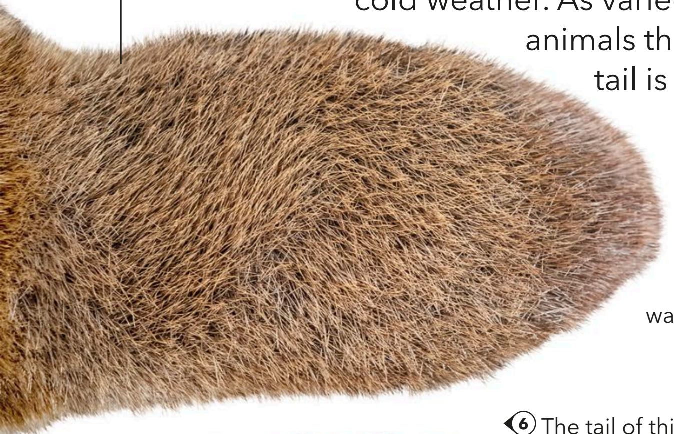
Telling tails

Hanging, steering, swatting, swimming – mammals use their tails to do all these and more. While some move their tails around to communicate, others swish theirs to keep insects at bay, and some curl up under theirs to stay warm in cold weather. As varied in shape, size, and function as the animals they belong to, can you tell which tail is whose?



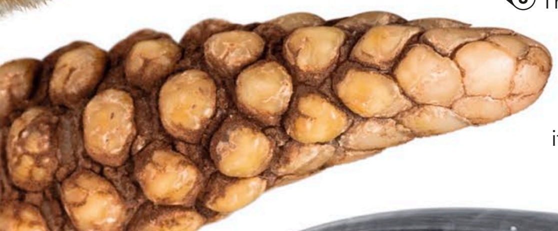
④ When this primate is looking for a mate, it covers its tail in a stinky substance and waves it in the air. The smelliest one in a group is considered the most attractive!

The long, distinctly patterned tail is also used to warn other animals of danger.

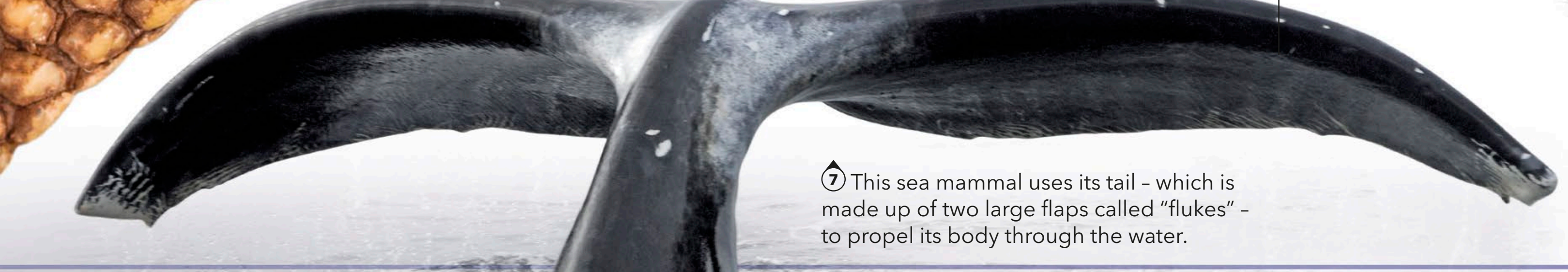


⑤ This water-loving animal uses its tail to store half of its body fat for times when food may be scarce. Females use theirs to keep eggs warm till they hatch.

The flat and wide tail helps steer the animal while swimming.



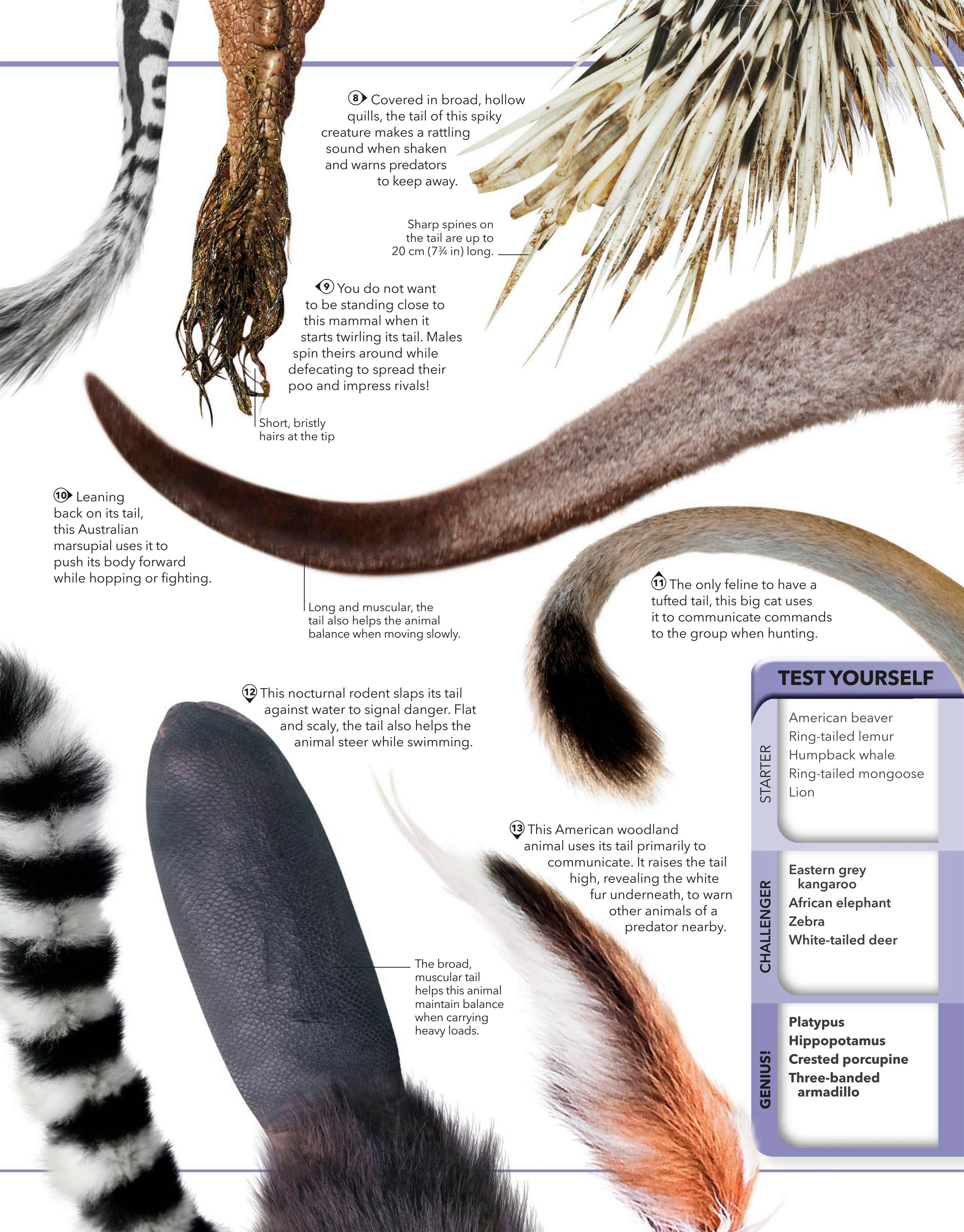
⑥ The tail of this creature is covered with bony plates like the rest of its body. When in danger, it rolls up into a ball, tucking its tail alongside its head to protect itself.



⑦ This sea mammal uses its tail – which is made up of two large flaps called "flukes" – to propel its body through the water.

The tail can be slapped on the surface of the water to communicate.

ANSWERS: 1. Ring-tailed mongoose 2. African elephant 3. Zebra 4. Ring-tailed lemur 5. Platypus 6. Three-banded armadillo 7. Humpback whale 8. Crested porcupine 9. Hippopotamus 10. Eastern grey kangaroo 11. Lion 12. American beaver 13. White-tailed deer



⑧ Covered in broad, hollow quills, the tail of this spiky creature makes a rattling sound when shaken and warns predators to keep away.

Sharp spines on the tail are up to 20 cm (7¾ in) long.

⑨ You do not want to be standing close to this mammal when it starts twirling its tail. Males spin theirs around while defecating to spread their poo and impress rivals!

Short, bristly hairs at the tip

⑩ Leaning back on its tail, this Australian marsupial uses it to push its body forward while hopping or fighting.

Long and muscular, the tail also helps the animal balance when moving slowly.

⑪ The only feline to have a tufted tail, this big cat uses it to communicate commands to the group when hunting.

⑫ This nocturnal rodent slaps its tail against water to signal danger. Flat and scaly, the tail also helps the animal steer while swimming.

The broad, muscular tail helps this animal maintain balance when carrying heavy loads.

⑬ This American woodland animal uses its tail primarily to communicate. It raises the tail high, revealing the white fur underneath, to warn other animals of a predator nearby.

TEST YOURSELF

STARTER

American beaver
Ring-tailed lemur
Humpback whale
Ring-tailed mongoose
Lion

CHALLENGER

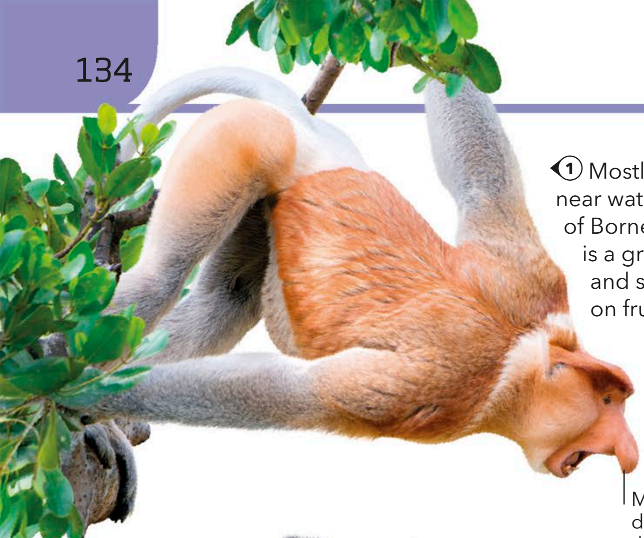
Eastern grey kangaroo
African elephant
Zebra
White-tailed deer

GENIUS!

Platypus
Hippopotamus
Crested porcupine
Three-banded armadillo

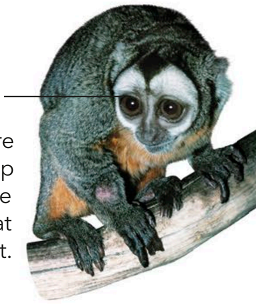
Monkey business

Clever, comic, and sometimes cunning, monkeys are the pranksters of the animal world. With their long limbs and nimble fingers, these playful primates love to wrestle, steal food, and scamper across trees.



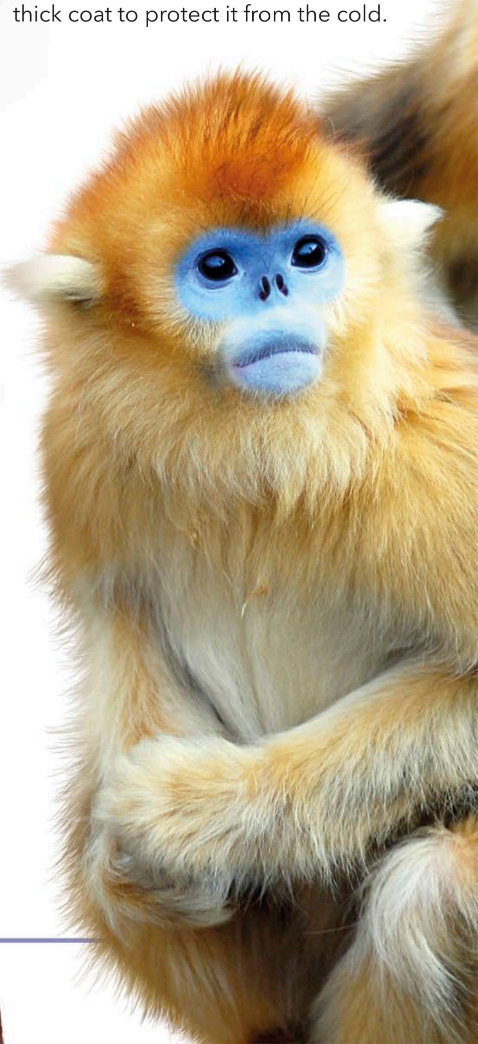
① Mostly found living near water in the forests of Borneo, this animal is a great swimmer and survives mainly on fruits and leaves.

Males have large, drooping noses that can measure up to 7.6 cm (3 in).

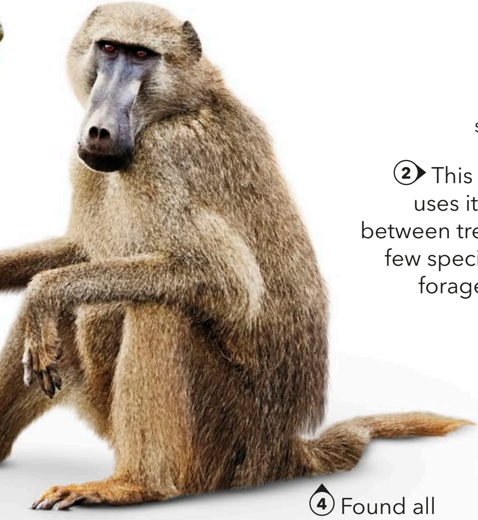


Large eyes help it see clearly at night.

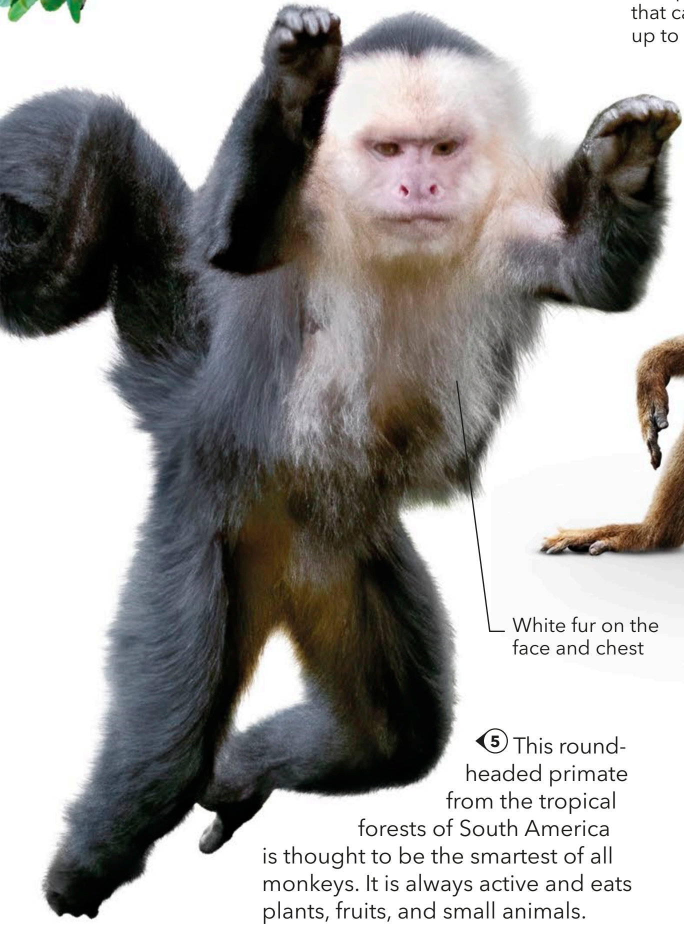
② This nocturnal creature uses its long legs to leap between trees. It is one of the few species of monkey that forage for food at night.



③ A flattened nose and beautiful fur give this primate its name. It lives in high forests in China, and needs a thick coat to protect it from the cold.

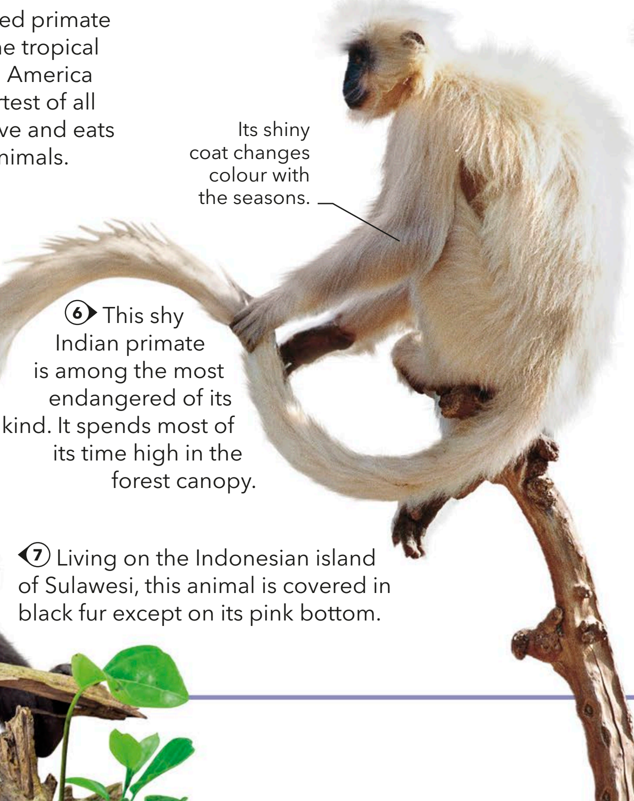


④ Found all over Africa, this large animal has a greenish grey coat, for which it is named. Hairless pads on its behind help it sit on trees without falling off.



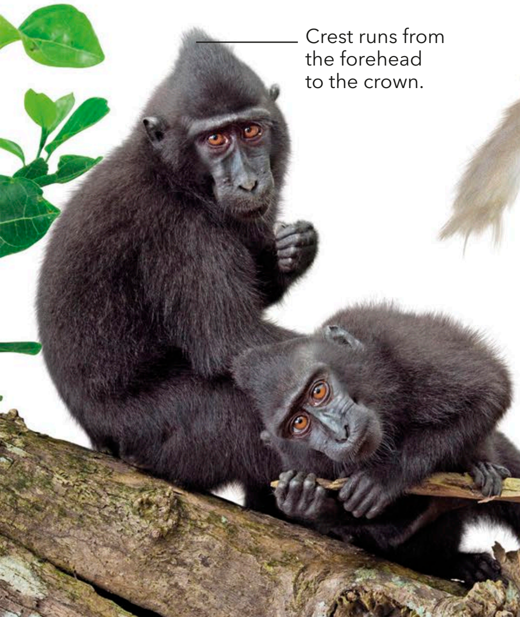
White fur on the face and chest

⑤ This round-headed primate from the tropical forests of South America is thought to be the smartest of all monkeys. It is always active and eats plants, fruits, and small animals.



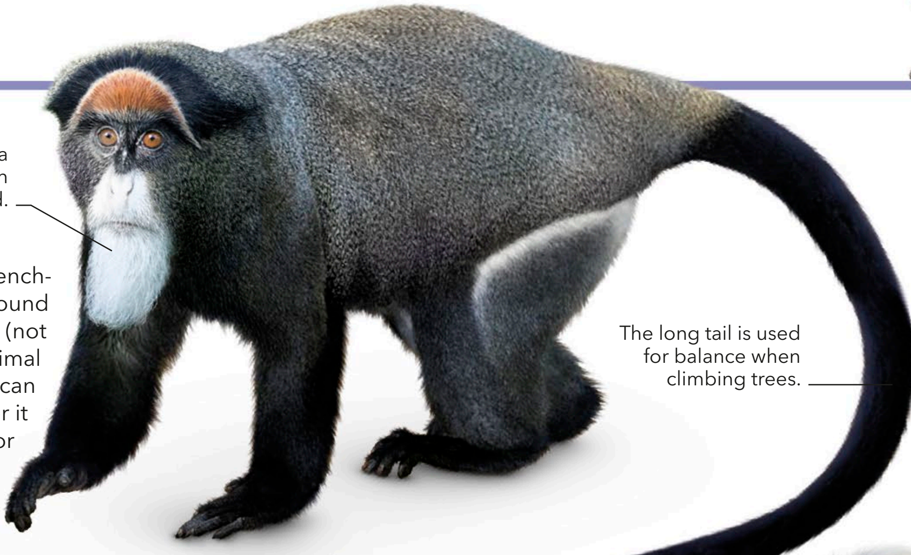
Its shiny coat changes colour with the seasons.

⑥ This shy Indian primate is among the most endangered of its kind. It spends most of its time high in the forest canopy.



Crest runs from the forehead to the crown.

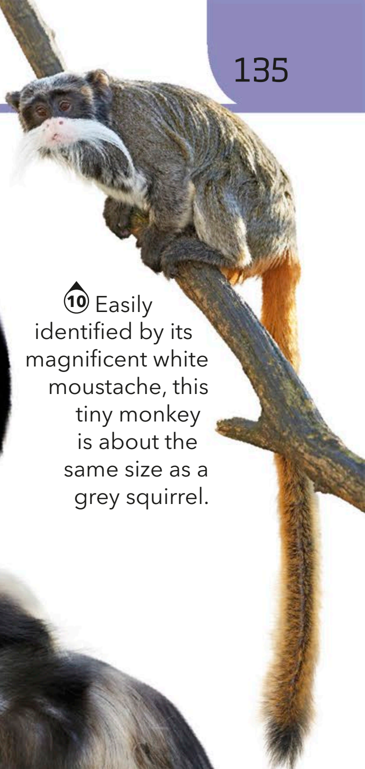
⑦ Living on the Indonesian island of Sulawesi, this animal is covered in black fur except on its pink bottom.



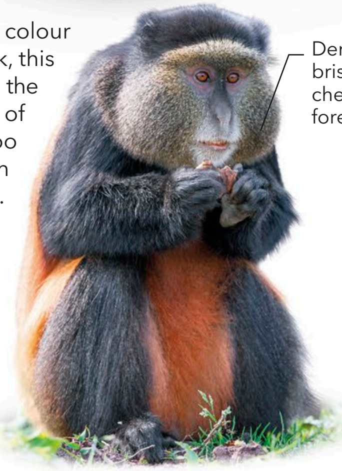
The animal grows a white beard when it is six weeks old.

The long tail is used for balance when climbing trees.

⑧ Named after a French-Italian explorer and around 54 cm (21¼ in) long (not including its tail), this animal is found in swampy African forests. When in danger it sits perfectly still for hours, until the threat has passed.

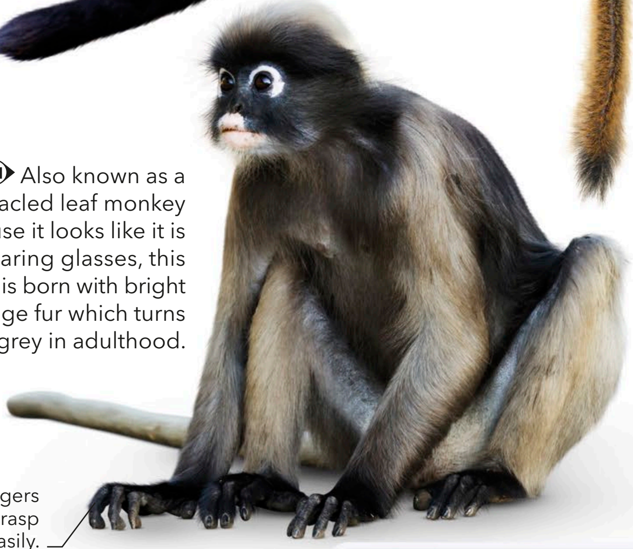


⑩ Easily identified by its magnificent white moustache, this tiny monkey is about the same size as a grey squirrel.



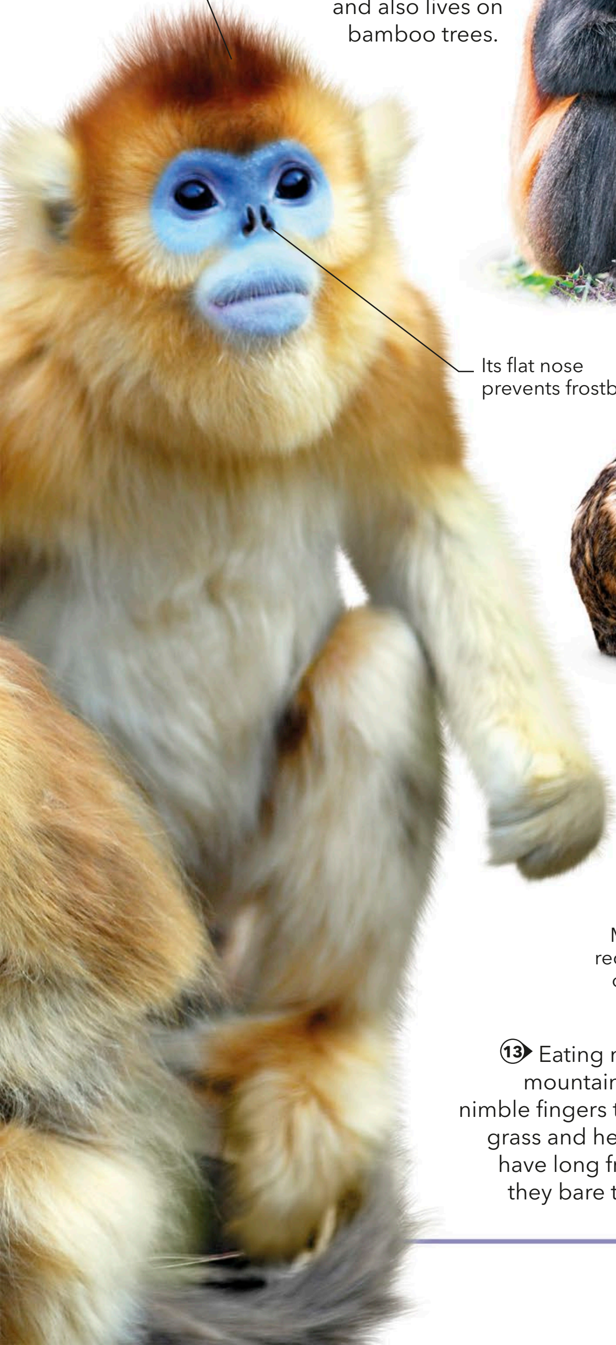
⑨ Named for the colour of the fur on its back, this primate is found in the Virunga Mountains of Africa. It eats bamboo and also lives on bamboo trees.

Dense yellow bristles on its cheeks and forehead



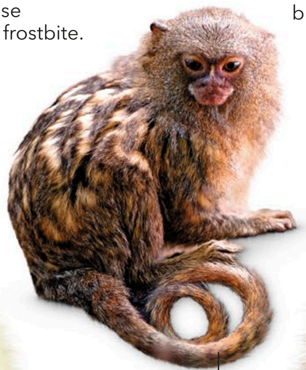
⑪ Also known as a spectacled leaf monkey because it looks like it is wearing glasses, this animal is born with bright orange fur which turns grey in adulthood.

Long fingers allow it to grasp branches easily.



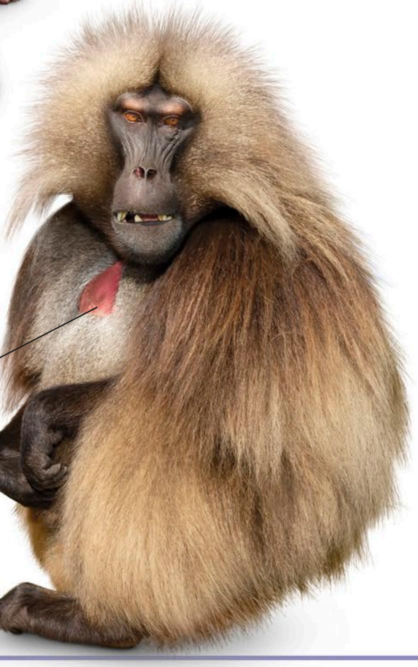
Dark brown crest on the head

Its flat nose prevents frostbite.



⑫ Weighing little more than 100 g (3½ oz), this is the smallest monkey in the world. It runs up and down trees, making holes in the bark and then lapping up the sap.

The tail can be longer than its body.



Males have a red bald patch on the chest.

⑬ Eating mainly grass, this mountain dweller uses its nimble fingers to pick blades of grass and herbs. Adult males have long front teeth, which they bare to warn off rivals.

TEST YOURSELF

STARTER

White-faced capuchin
Pygmy marmoset
Golden snub-nosed monkey
Northern night monkey

CHALLENGER

Proboscis monkey
Gelada
Emperor tamarin
Golden monkey
Olive baboon

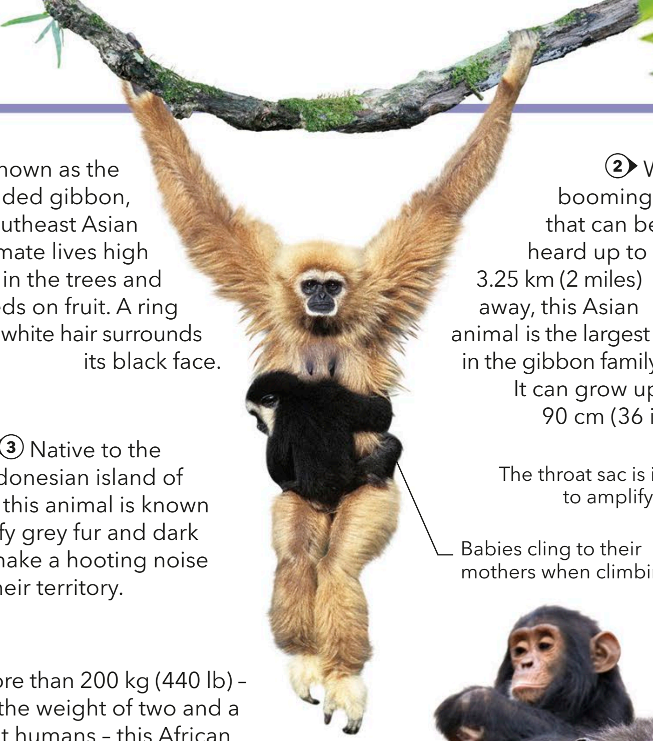
GENIUS!

De Brazza's monkey
Gee's golden langur
Dusky leaf monkey
Celebes crested macaque

ANSWERS: 1. Proboscis monkey 2. Northern night monkey 3. Golden snub-nosed monkey 4. Olive baboon 5. White-faced capuchin 6. Gee's golden langur 7. Celebes crested macaque 8. De Brazza's monkey 9. Golden monkey 10. Emperor tamarin 11. Dusky leaf monkey 12. Pygmy marmoset 13. Gelada

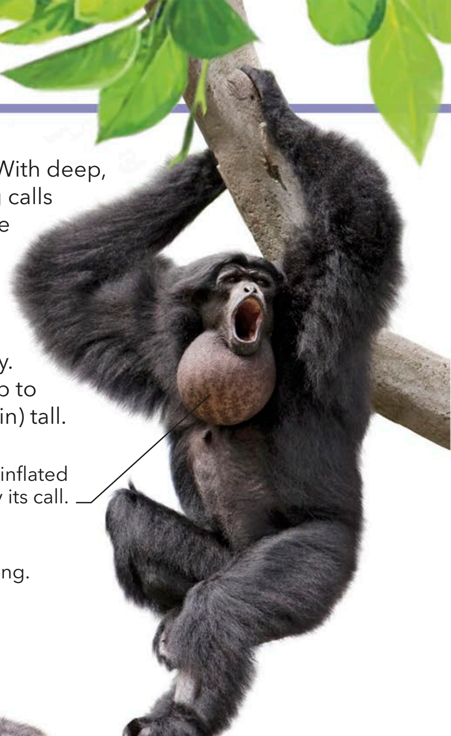
Ape antics

The closest living relatives of human beings, apes are highly intelligent. This group of animals consists of great apes, such as gorillas, orangutans, and chimpanzees, and lesser apes, or gibbons, which are usually smaller. All apes have opposable thumbs (they can pinch their thumb and fingers together), which allows them to pick up and hold objects.



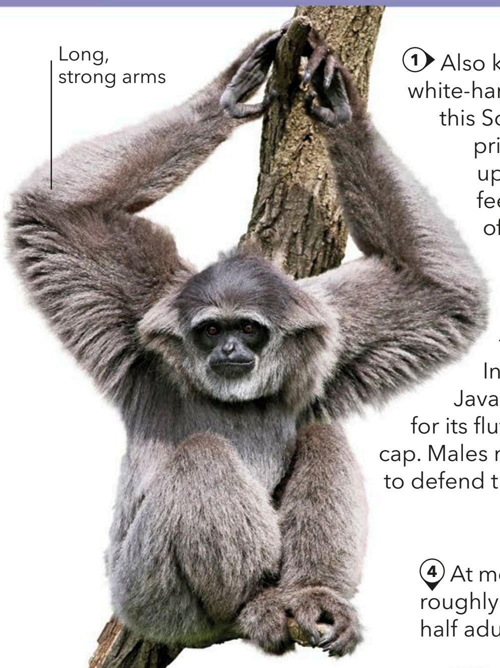
① Also known as the white-handed gibbon, this Southeast Asian primate lives high up in the trees and feeds on fruit. A ring of white hair surrounds its black face.

Babies cling to their mothers when climbing.



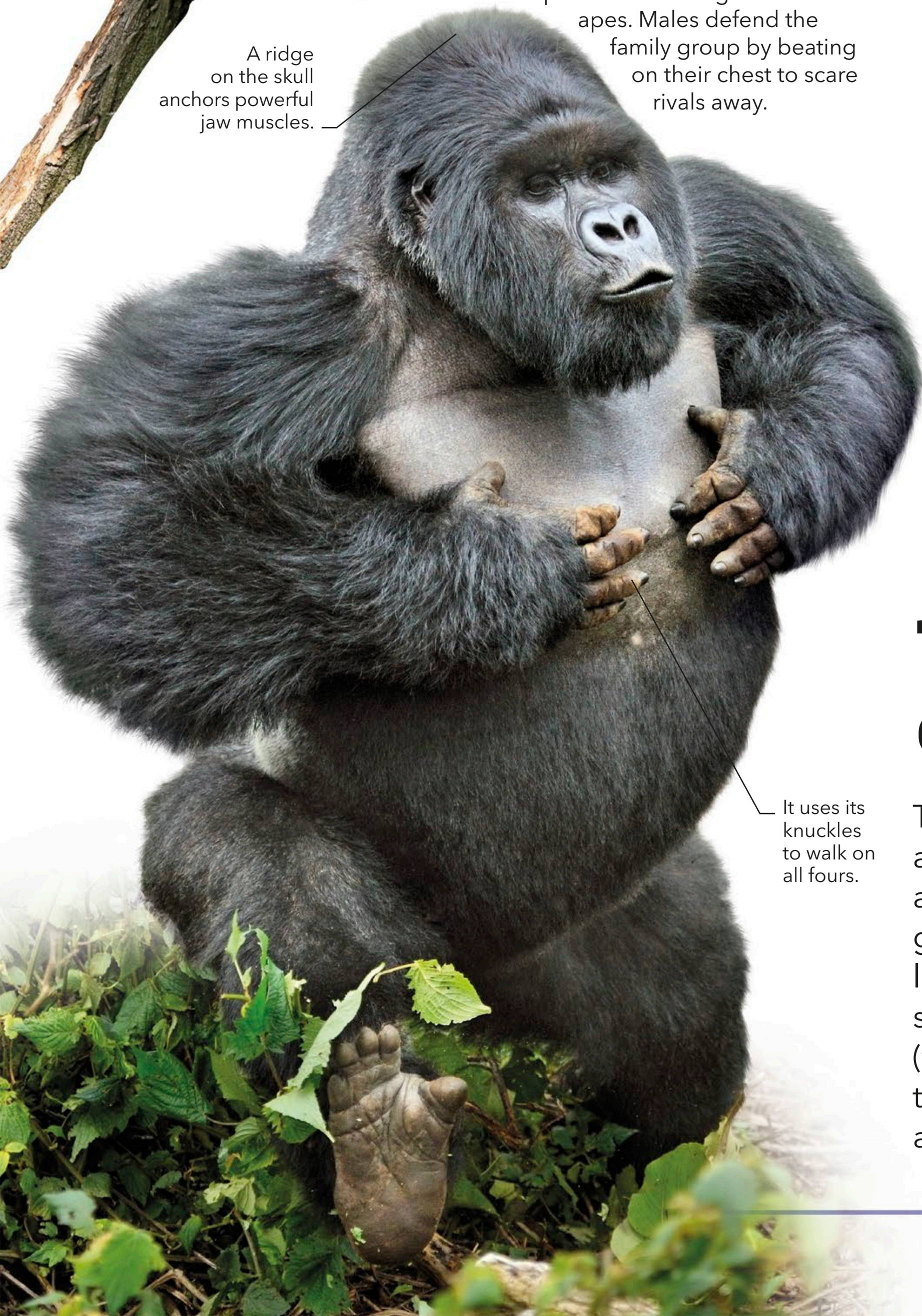
② With deep, booming calls that can be heard up to 3.25 km (2 miles) away, this Asian animal is the largest in the gibbon family. It can grow up to 90 cm (36 in) tall.

The throat sac is inflated to amplify its call.



Long, strong arms

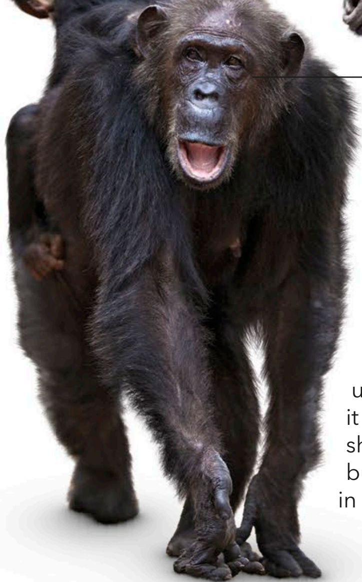
③ Native to the Indonesian island of Java, this animal is known for its fluffy grey fur and dark cap. Males make a hooting noise to defend their territory.



④ At more than 200 kg (440 lb) – roughly the weight of two and a half adult humans – this African primate is the largest of all apes. Males defend the family group by beating on their chest to scare rivals away.

A ridge on the skull anchors powerful jaw muscles.

It uses its knuckles to walk on all fours.



⑤ This clever creature found in African rainforests uses tools to find food – it has been known to sharpen sticks to spear bushbabies hiding in tree holes.

Bare skin on its face darkens with age.

TEST YOURSELF

STARTER

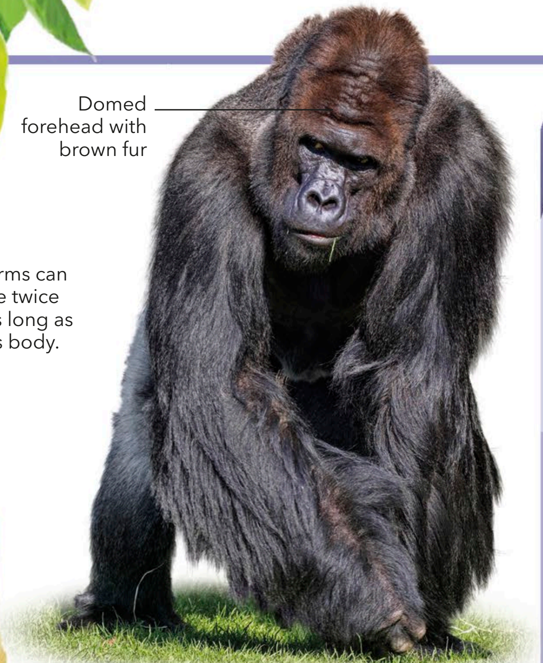
Mountain gorilla
Eastern chimpanzee
Silvery gibbon

CHALLENGER

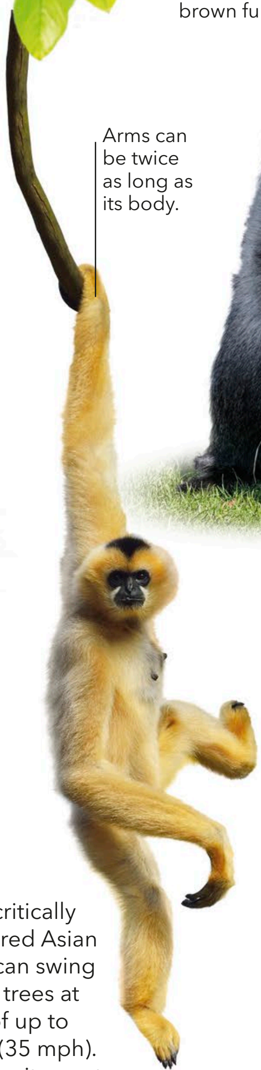
Western gorilla
Bonobo
Sumatran orangutan
Eastern black-crested gibbon

GENIUS!

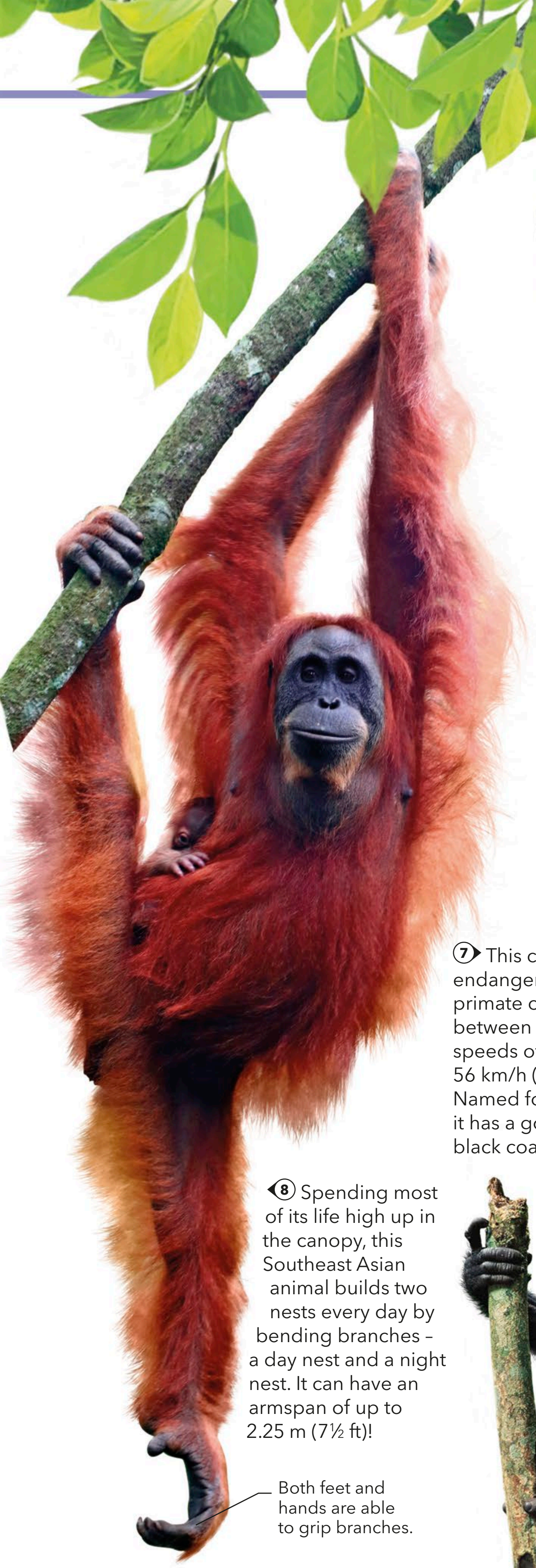
Siamang
Bornean orangutan
Lar gibbon



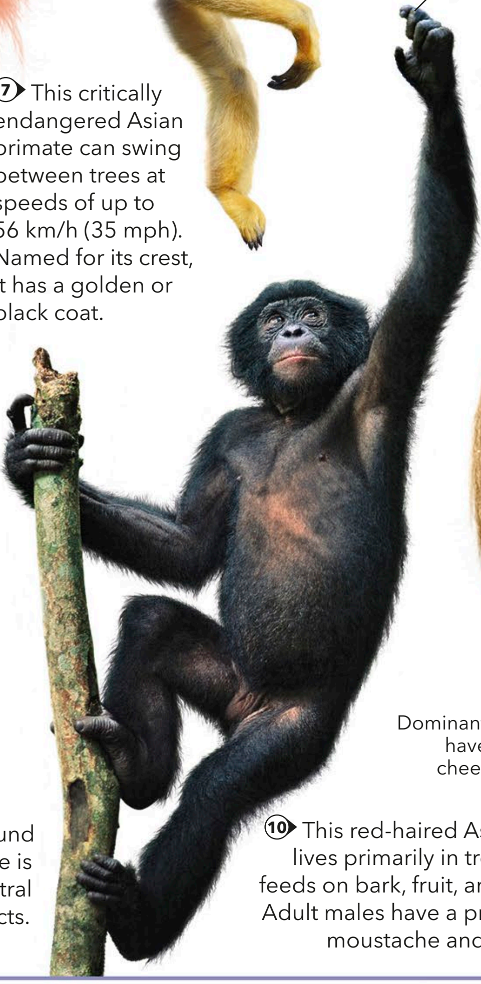
⑥ Almost entirely vegetarian, this great ape is found in the swamps and lowland forests of Central Africa. Its jaw muscles and teeth are adapted for chewing plants.



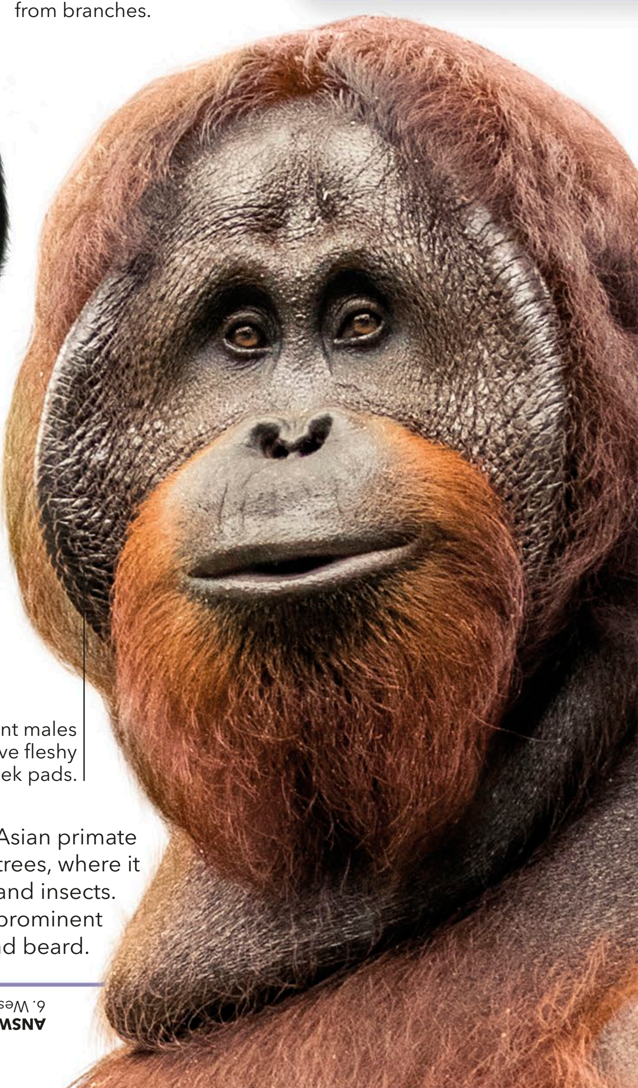
⑦ This critically endangered Asian primate can swing between trees at speeds of up to 56 km/h (35 mph). Named for its crest, it has a golden or black coat.



⑧ Spending most of its life high up in the canopy, this Southeast Asian animal builds two nests every day by bending branches – a day nest and a night nest. It can have an armspan of up to 2.25 m (7½ ft)!

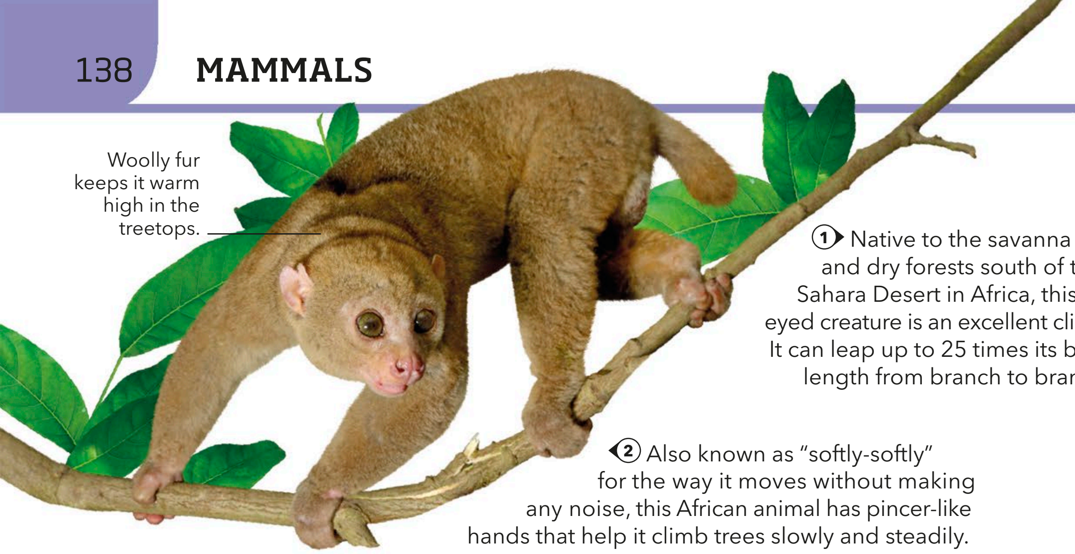


⑨ Living in trees as well as on the ground in groups led by females, this great ape is found in the tropical rainforests of Central Africa. It eats fruit, eggs, and insects.



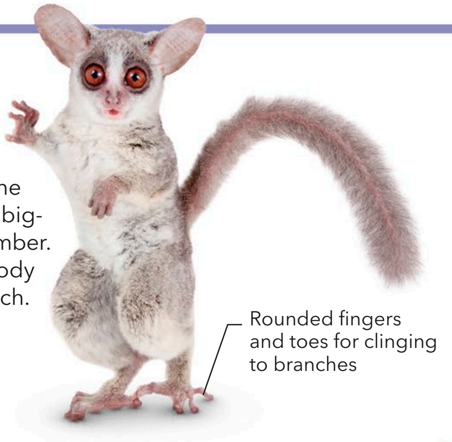
⑩ This red-haired Asian primate lives primarily in trees, where it feeds on bark, fruit, and insects. Adult males have a prominent moustache and beard.

ANSWERS: 1. Lar gibbon 2. Siamang 3. Silvery gibbon 4. Mountain gorilla 5. Eastern chimpanzee 6. Western gorilla 7. Eastern black-crested gibbon 8. Sumatran orangutan 9. Bonobo 10. Bornean orangutan



Woolly fur keeps it warm high in the treetops.

② Also known as "softly-softly" for the way it moves without making any noise, this African animal has pincer-like hands that help it climb trees slowly and steadily.



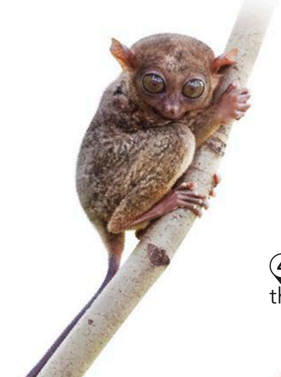
① Native to the savanna and dry forests south of the Sahara Desert in Africa, this big-eyed creature is an excellent climber. It can leap up to 25 times its body length from branch to branch.

Rounded fingers and toes for clinging to branches

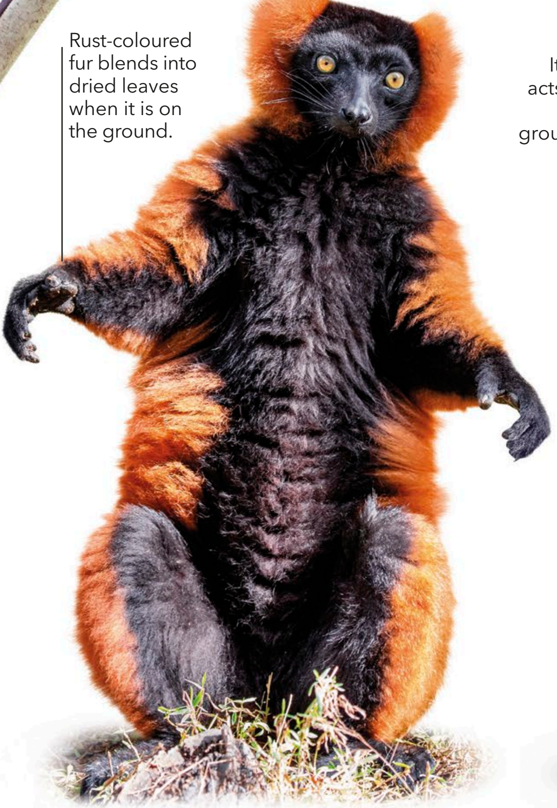
Tree dwellers

Eating, sleeping, playing, and even raising their young high up in the canopy, lemurs, bushbabies, and their relatives are arboreal – or tree-living – primates. They have long fingers and toes that give them a firm grip on branches. Most only come out under the cover of darkness, but a few love to bask in the Sun.

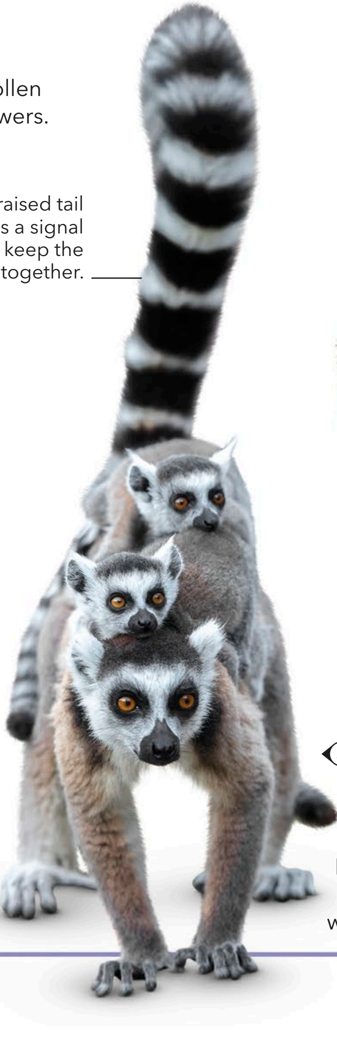
③ This animal has eyes bigger than its brain – the biggest eyes of any mammal, relative to its size. In fact the eyes are so large they do not rotate in their sockets, but its head can turn almost a full circle.



④ While fruit makes up most of this animal's diet, it also uses its long snout to feed on pollen and nectar inside flowers.

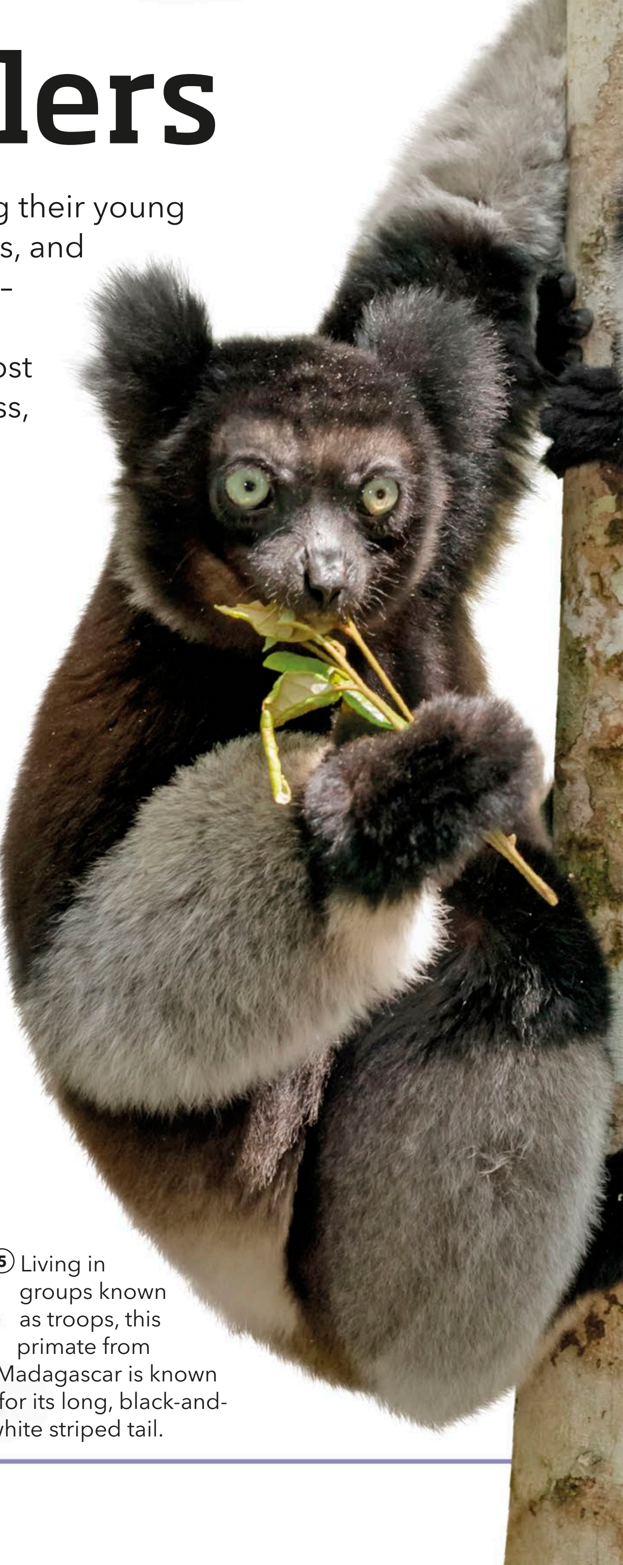


Rust-coloured fur blends into dried leaves when it is on the ground.

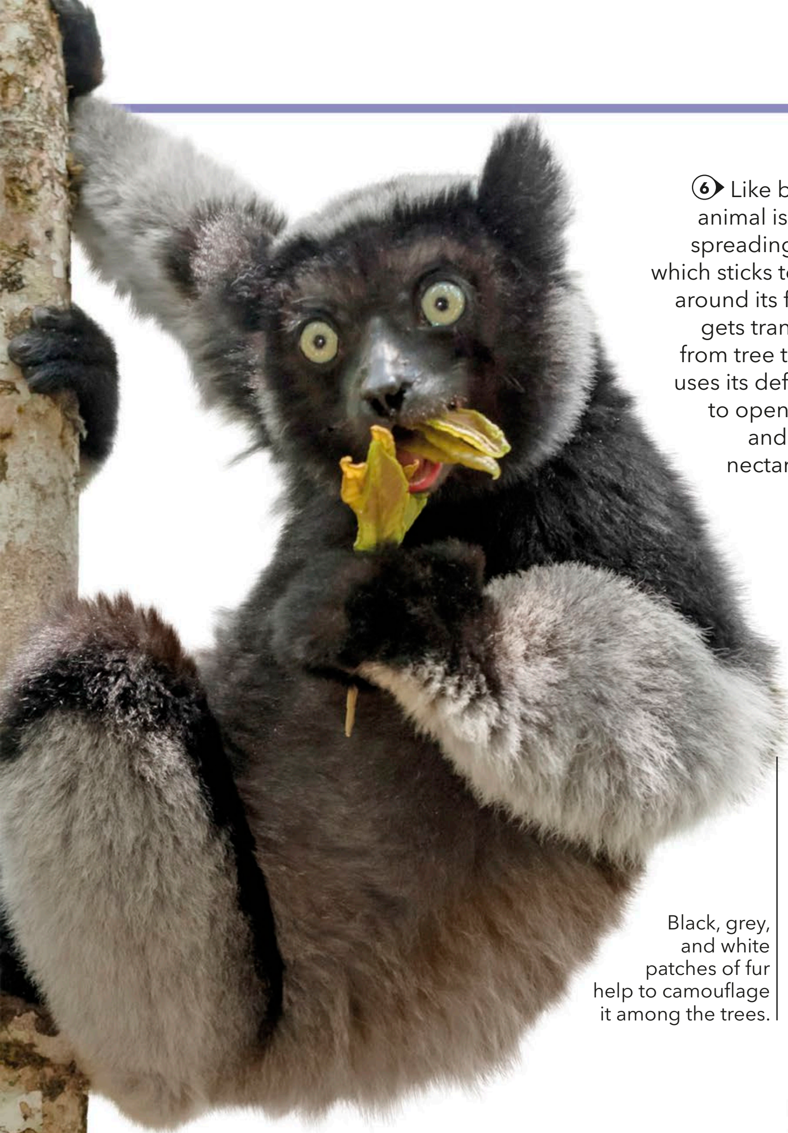


Its raised tail acts as a signal to keep the group together.

⑤ Living in groups known as troops, this primate from Madagascar is known for its long, black-and-white striped tail.

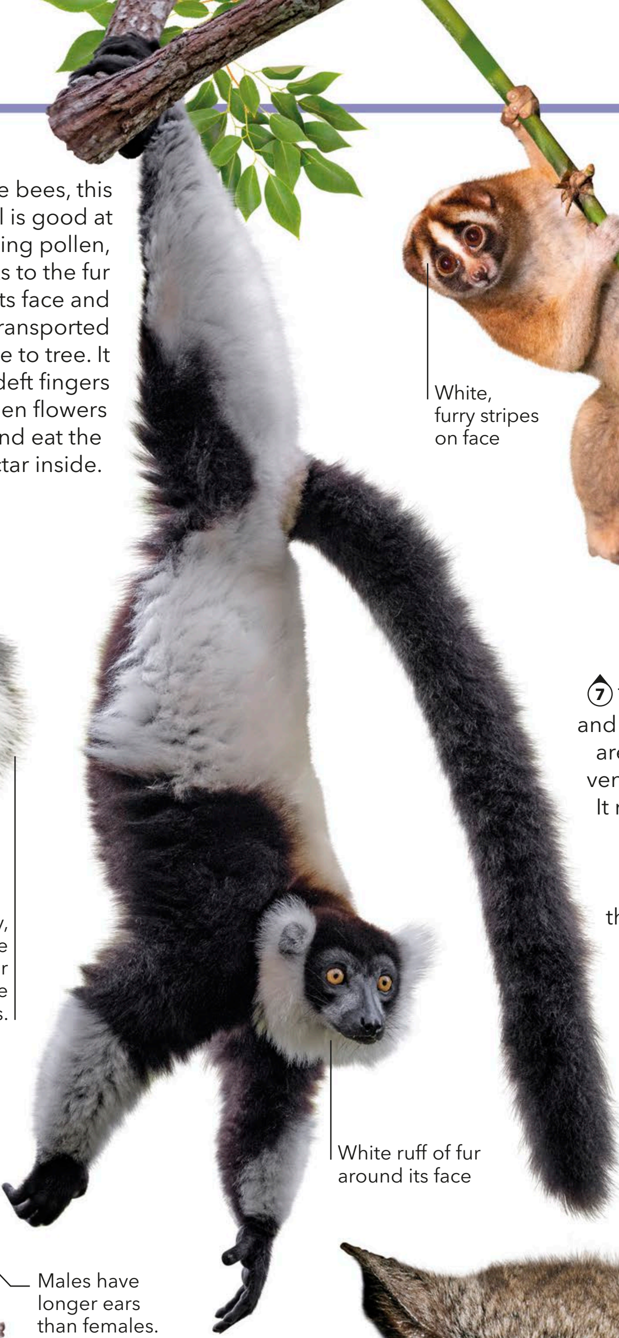


ANSWERS: 1. Senegal bushbaby 2. Potto 3. Philippine tarsier 4. Red-ruffed lemur 5. Ring-tailed lemur 6. Black-and-white-ruffed lemur 7. Javan slow loris 8. Indri 9. Pygmy mouse lemur 10. Southern lesser galago



Large feet for gripping very thick branches

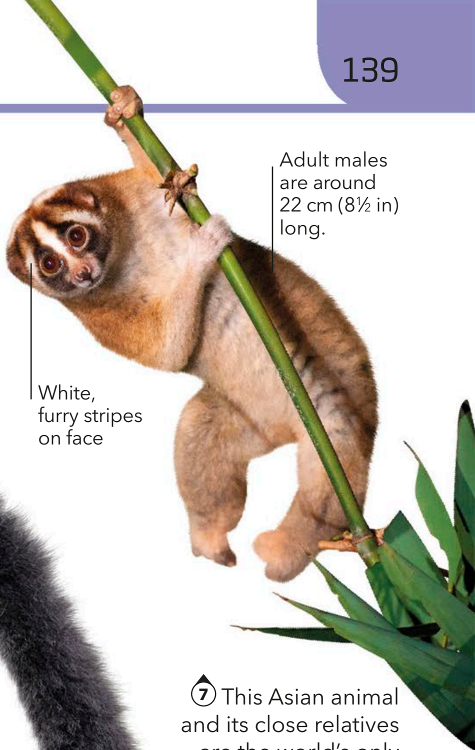
⑧ The largest lemur, growing up to 70 cm (28 in) in length, this animal is the only one of its family that communicates through song.



⑥ Like bees, this animal is good at spreading pollen, which sticks to the fur around its face and gets transported from tree to tree. It uses its deft fingers to open flowers and eat the nectar inside.

Black, grey, and white patches of fur help to camouflage it among the trees.

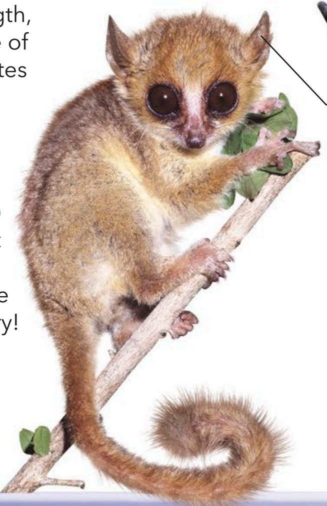
White ruff of fur around its face



Adult males are around 22 cm (8½ in) long.

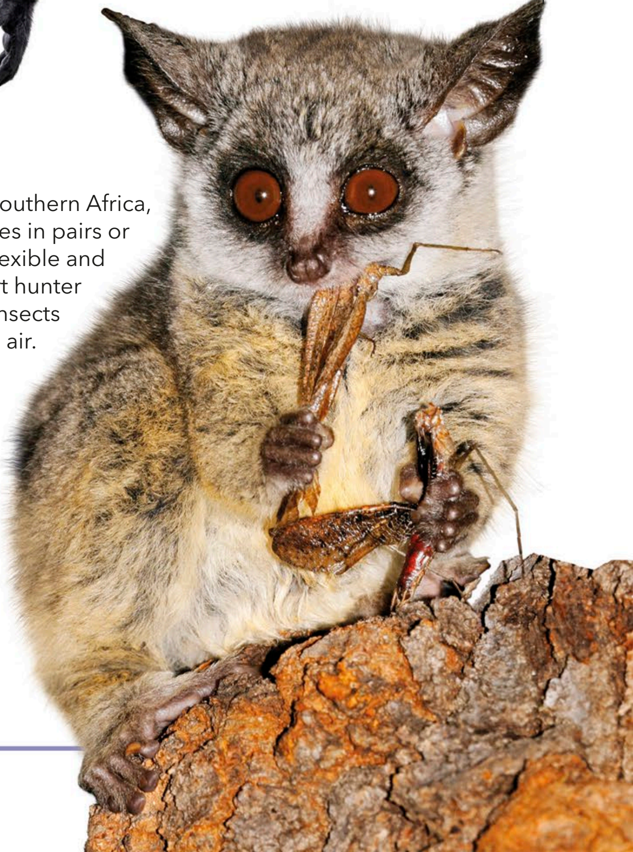
White, furry stripes on face

⑦ This Asian animal and its close relatives are the world's only venomous primates. It makes an oil in its elbow that is venomous when mixed with spit, then licks this over its babies to protect them.



Males have longer ears than females.

⑨ About 6.3 cm (2½ in) long, this is the smallest of the primates. It weighs just 30 g (1 oz) – about the same as a AA battery!



Large, bat-like ears can be folded down when leaping through thorny bushes.

⑩ Found in southern Africa, this creature lives in pairs or small groups. Flexible and agile, it is an expert hunter and can snatch insects from the air.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Ring-tailed lemur	**Pygmy mouse lemur**	**Senegal bushbaby**
Black-and-white ruffed lemur	**Javan slow loris**	**Southern lesser galago**
Red-ruffed lemur	**Philippine tarsier**	**Potto**
		Indri

Short fur traps air and repels water to keep the animal warm.

① This flippered animal has two layers of hair – a coarse outer coat, and a soft inner pelt. The outer hairs protect the inner fur and skin from extreme cold.

② This animal has a pattern of black and white stripes that confuses predators when seen in a herd full of striped bodies.

③ Green algae grows on the surface of this slow-moving animal's fur, which is also home to moths and other insects.

⑥ Short, velvety grey fur helps this small animal move easily through soil while digging burrows. It spends most of its life underground.

④ The rosettes on the fur of this big cat help it hide in dense foliage when stalking its prey.

⑤ Thick fur keeps this bushy-tailed rodent warm in winter. In summer, it sheds its thick coat to keep cooler under the warm Sun.

⑦ A coat of short, coarse hair keeps this Australian mammal warm, while its long spines protect it from predators.

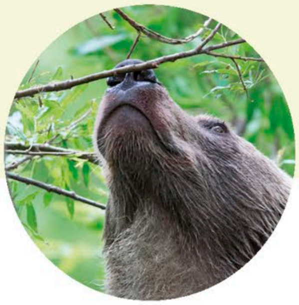
TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Northern giraffe	**Leopard**	**Lesser hedgehog tenrec**
Zebra	**Red squirrel**	**Common seal**
Cheetah	**European mole**	**Sea otter**
Black panther	**Sloth**	**Tapir**
	Short-beaked echidna	

Night senses

Night vision
Big eyes allow animals to see superbly at night, and spot unsuspecting prey. The relatively small tarsier has eyes around 1.5 cm (½ in) in diameter – about the same size as its brain!

Specialized hearing
Large, sensitive ears are able to detect sounds over long distances, or the slightest movements in the dark. Bat-eared foxes can even hear tiny termites scuttling underground!



Super scent
Long snouts allow animals, such as brown bears, to hunt for food at night. A brown bear's sense of smell is 2,000 times better than a human's.

Whiskers
Big cats, such as lions, can feel things in the dark using their whiskers. The hair follicles of each whisker are packed with sensory cells that can detect the smallest movements.

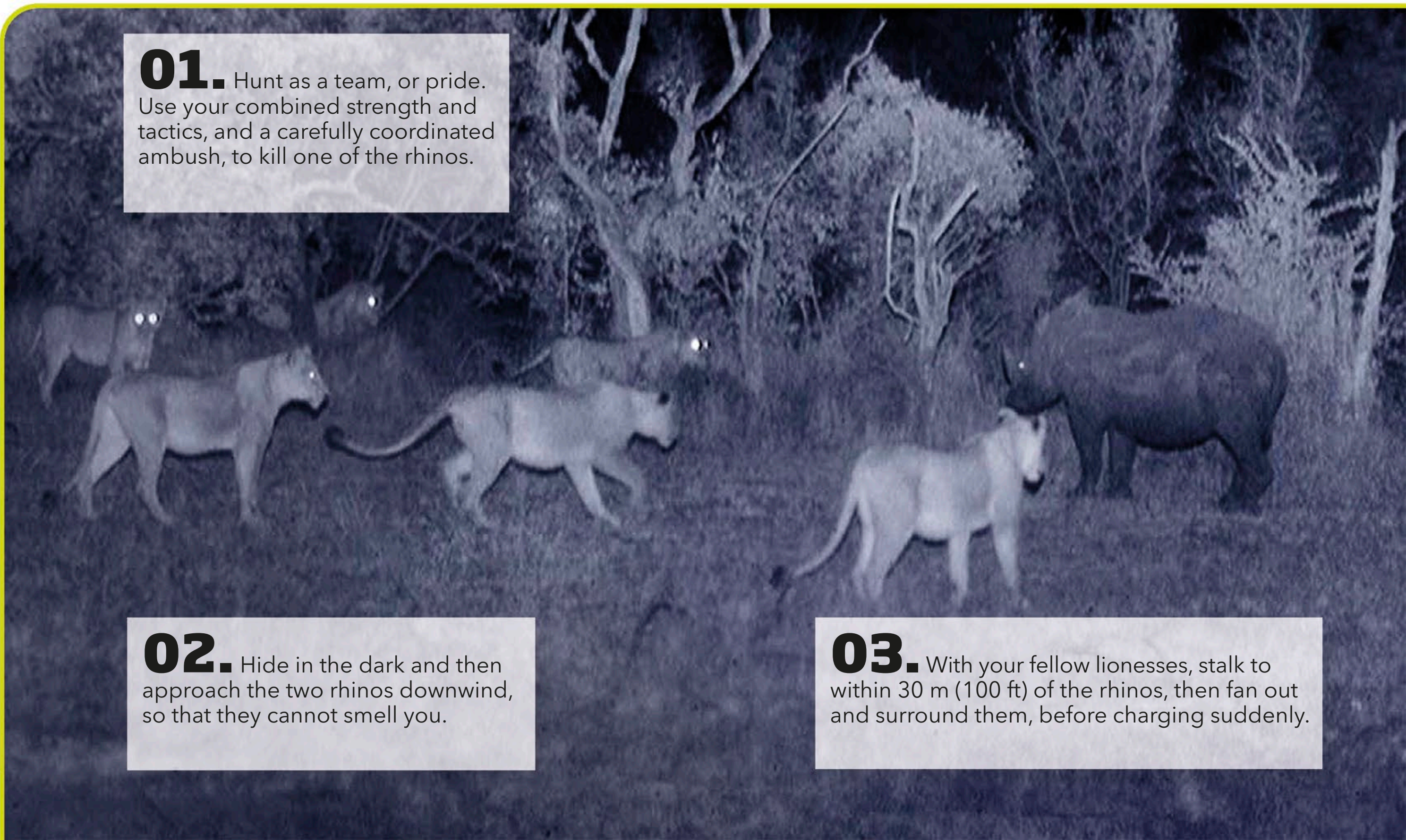
Night life

As the Sun goes down and you prepare yourself for a long night's sleep, some animals are just getting ready to start their day. These creatures of the night have special features for hunting, and escaping predators, in the dark. From huge eyes to funnel-like ears, these mammals have what it takes to survive and thrive at night.

I don't believe it!

Binturongs are primarily nocturnal animals and are related to mongooses. They leave a scent trail of urine, which smells like hot popcorn.

How to hunt like a lioness



01. Hunt as a team, or pride. Use your combined strength and tactics, and a carefully coordinated ambush, to kill one of the rhinos.

02. Hide in the dark and then approach the two rhinos downwind, so that they cannot smell you.

03. With your fellow lionesses, stalk to within 30 m (100 ft) of the rhinos, then fan out and surround them, before charging suddenly.

In numbers

15
The number of echolocation calls per second made by a hunting bat.

200
The number of earthworms a badger can consume in a single evening.

4 m
(13 ft) The distance a Spix's night monkey can leap in the dark!

Foraging for food

The aye-aye lives in Madagascar and is the world's largest nocturnal primate. It spends 80 per cent of the night foraging for food. It uses its long middle finger to tap on trees, then listens to the echoes that return to detect wood-boring insects inside. Using the same finger, it then digs out the insects from beneath the bark.

Echolocation

The call of a bat is so high-pitched that humans cannot hear it. But a bat's ears are tuned into the echoes that bounce off obstacles – such as flying insects – allowing the bat to detect and hunt prey in the dark. This ability is called echolocation.

The returning echo reaches the bat, giving it a precise location of the moth.

Sound waves bounce off the moth.

A loud clicking sound emitted by the bat moves outwards.

Electric sixth sense

When hunting in murky waters, the mostly nocturnal platypus uses its bill to detect electric signals from its prey, such as fish and shrimp.

04. Target the smaller and weaker rhino. Work as a team and use your strong, sharp claws to attack by clinging to the rhino and dragging it down.

05. Use your massive, stabbing canine teeth, and cheek teeth with blade-like edges to slice through the tough hide of the rhino.

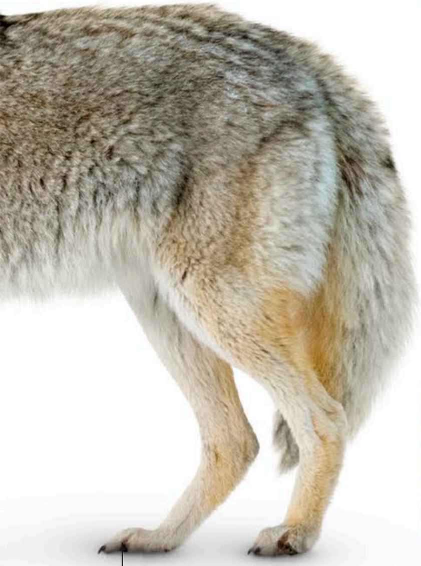
06. Chances of killing a huge, powerful rhino are slim, but if you are lucky, you will kill one of them and eat well.

After-dark facts

Aardvarks spend their nights digging burrows to look for food. They can dig 0.6 m (2 ft) in 15 seconds.

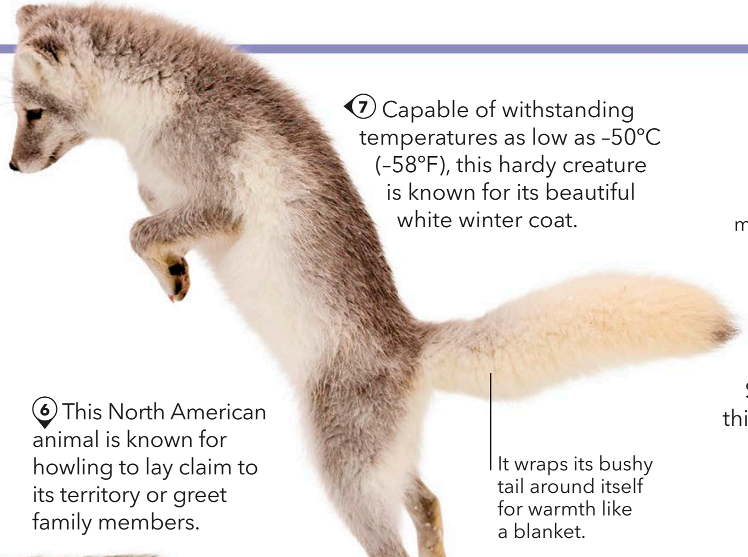
The call of the lesser bulldog bat is 137 decibels – louder than the jet engine of a passenger aircraft.

Weighing just 1.8 g (0.06 oz), Etruscan shrews are one of the smallest nocturnal mammals. They prey on insects, worms, snails, and spiders.



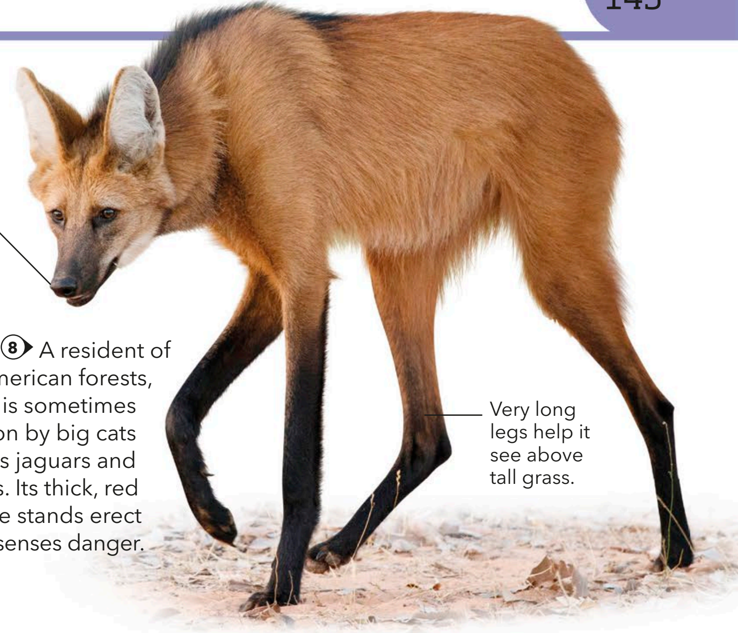
⑥ This North American animal is known for howling to lay claim to its territory or greet family members.

Large toes support its weight while running fast.



⑦ Capable of withstanding temperatures as low as –50°C (–58°F), this hardy creature is known for its beautiful white winter coat.

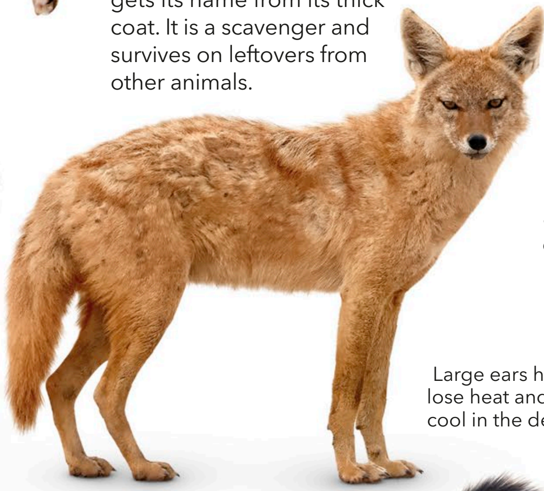
It wraps its bushy tail around itself for warmth like a blanket.



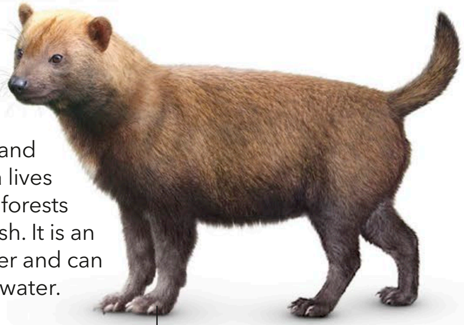
⑧ A resident of South American forests, this canine is sometimes preyed on by big cats such as jaguars and pumas. Its thick, red mane stands erect when it senses danger.

Black muzzle

Very long legs help it see above tall grass.

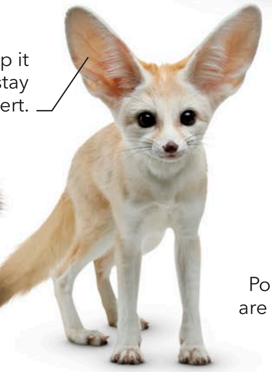


⑨ Living in dry habitats, this short-snouted animal gets its name from its thick coat. It is a scavenger and survives on leftovers from other animals.



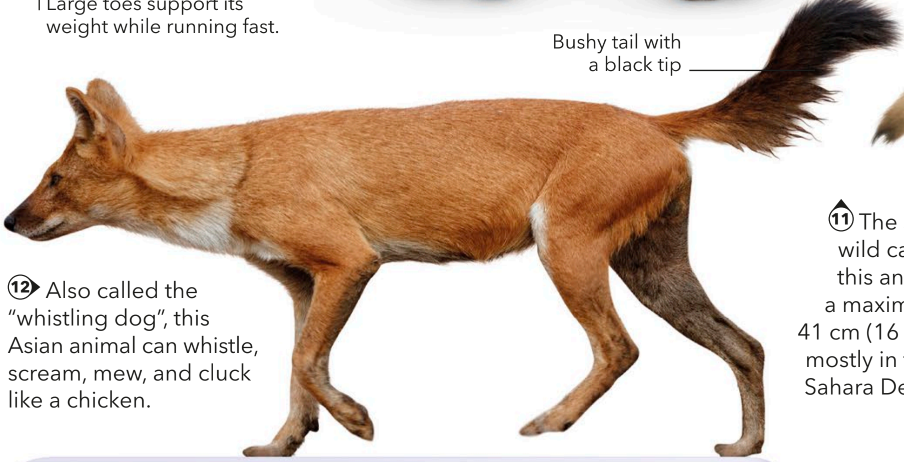
⑩ This short, stocky canine from Central and South America lives in small packs in forests and low-lying bush. It is an excellent swimmer and can even dive underwater.

Partially webbed toes help it swim fast.



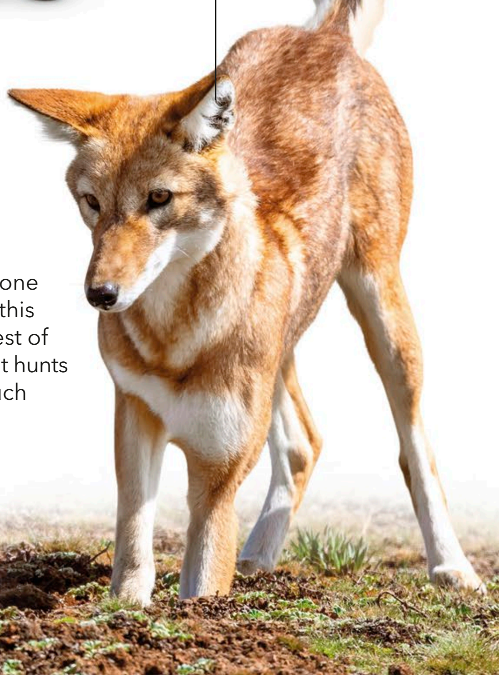
⑪ The smallest of all wild canine species, this animal grows to a maximum length of 41 cm (16 in). It is found mostly in the scorching Sahara Desert in Africa.

Large ears help it lose heat and stay cool in the desert.



⑫ Also called the "whistling dog", this Asian animal can whistle, scream, mew, and cluck like a chicken.

Bushy tail with a black tip

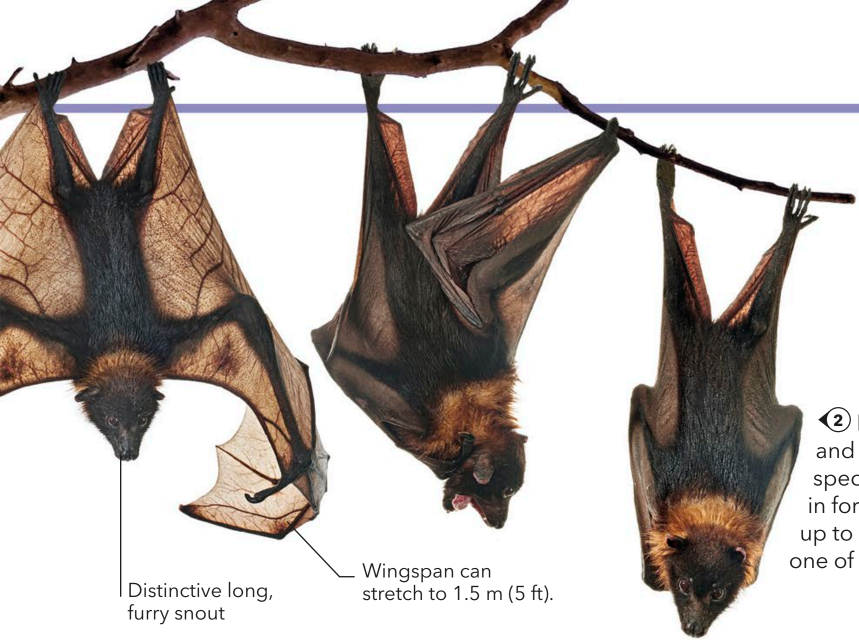


⑬ Native to just one country in Africa, this species is the rarest of its kind on Earth. It hunts small mammals such as grass rats.

Pointed ears are lined with white fur

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Grey wolf	**African wild dog**	**Dhole**
Red fox	**Coyote**	**Bush dog**
Arctic fox	**Raccoon dog**	**Ethiopian wolf**
Dingo	**Maned wolf**	**Fennec fox**
Golden jackal		

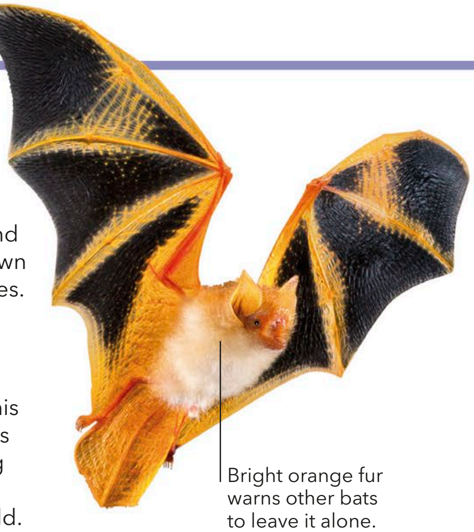


Distinctive long, furry snout

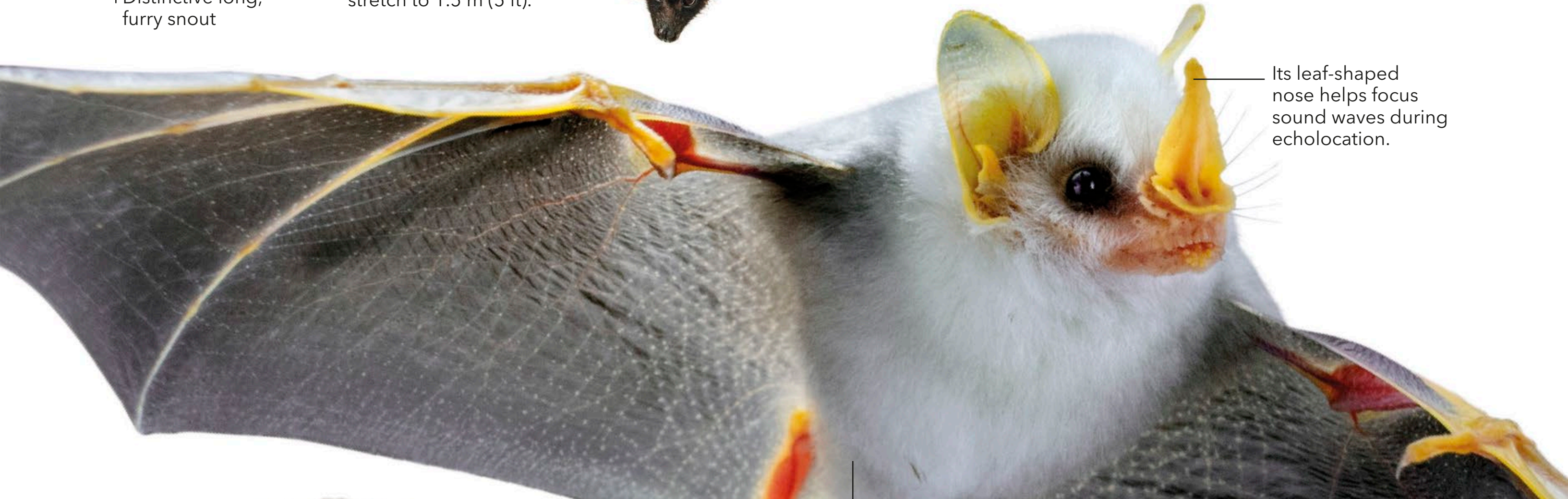
Wingspan can stretch to 1.5 m (5 ft).

② Found throughout India and parts of Southeast Asia, this species roosts in large colonies in forests and swamps. Growing up to 22 cm (9 in) in length, it is one of the largest bats in the world.

① One of the most colourful bat species in the world, this flying mammal from Asia can be found hanging upside down in banana trees.



Bright orange fur warns other bats to leave it alone.



Its leaf-shaped nose helps focus sound waves during echolocation.

White fur is tinted green when sunlight filters through the green leaves, hiding it from predators.

④ This bat lives in Central America and shelters under the big leaves of heliconia plants, which it shapes into tents by biting through the leaves till they collapse into an inverted V-shape. Up to 12 bats can take cover under one leaf.

③ This bat is found in Central and South America and is famous for feeding on the blood of animals, including birds, pigs, and horses. It uses its incredibly sharp teeth to bite these animals, and then laps up their flowing blood using its tongue.

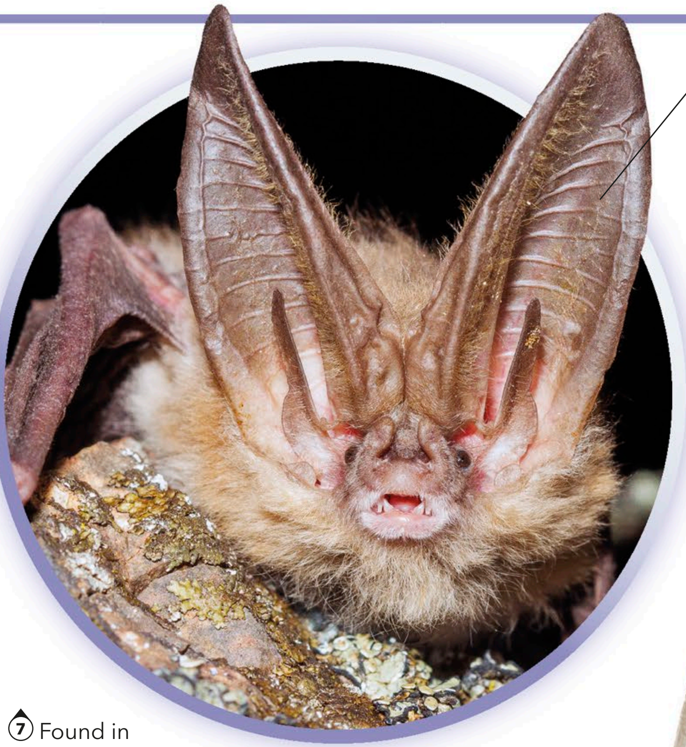
Brilliant bats

The only true flying mammals, bats have adaptations, such as big ears, excellent eyesight, and an ability to find food through echolocation, that make many of them expert hunters. To hunt at night, a bat emits a high-pitched sound. When the sound waves hit an object, such as an insect, they produce an echo that helps the bat to find it.

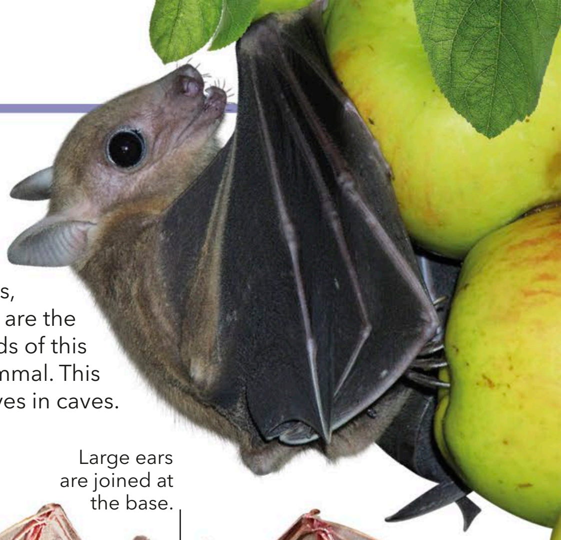
Broad, rounded ears

⑤ This bat is one of the smallest mammals in the world and weighs just 6 g (⅕ oz). Despite its small size, it can catch and eat up to 3,000 insects in a single night.

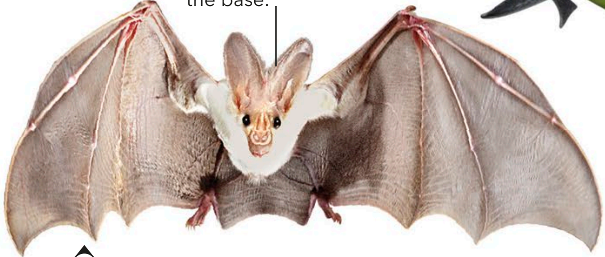
ANSWERS: 1. Painted bat 2. Indian flying fox 3. Common vampire bat 4. Honduran white bat 5. Common pipistrelle 6. Egyptian fruit bat 7. Townsend's big-eared bat 8. Greater bulldog bat 9. Ghost bat 10. Greater horseshoe bat



Ears can move independently to catch the slightest movement.



⑥ Dates, apples, and apricots are the favourite foods of this flying mammal. This bat lives in caves.

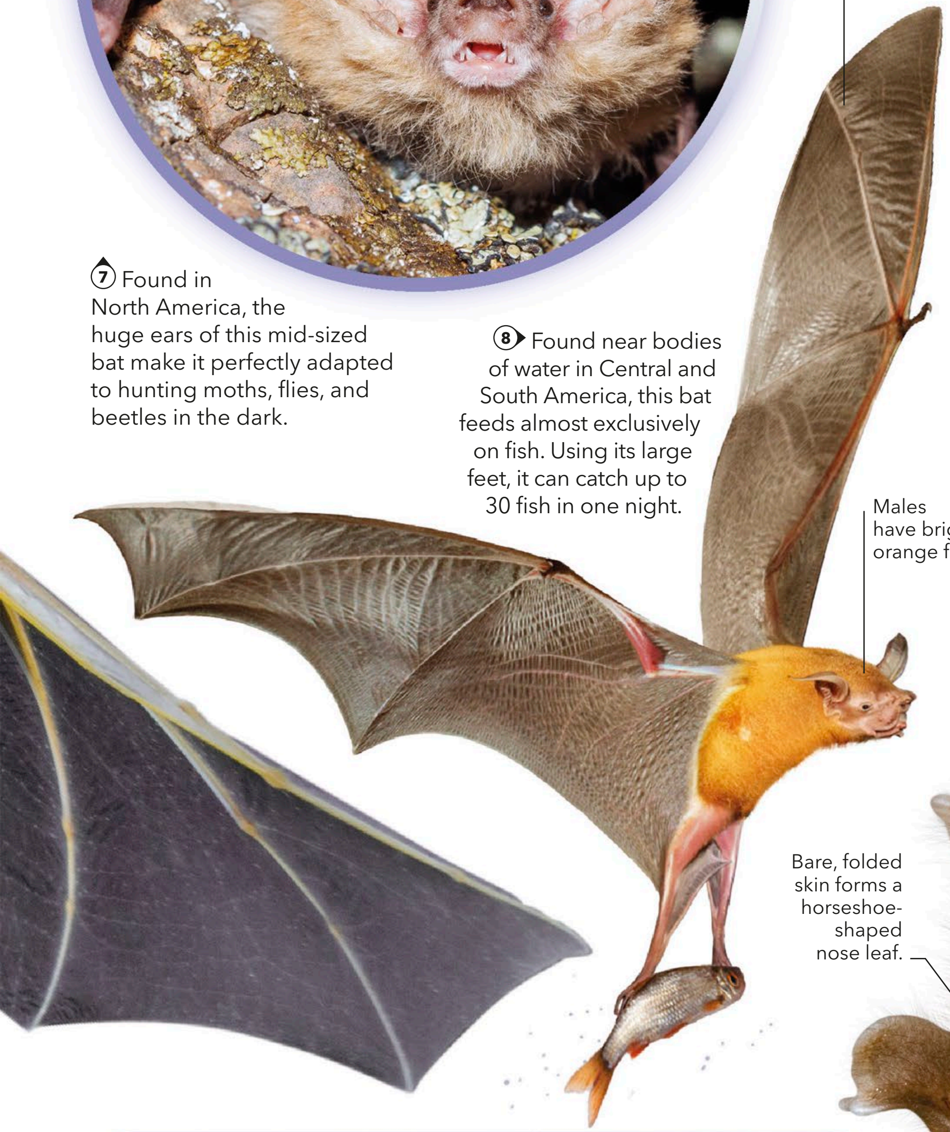


Large ears are joined at the base.

⑨ Snowy-white, with long ears and almost transparent wings, this Australian bat is a powerful hunter with very large teeth and looks for prey on the ground. It eats frogs, lizards, and birds.

⑦ Found in North America, the huge ears of this mid-sized bat make it perfectly adapted to hunting moths, flies, and beetles in the dark.

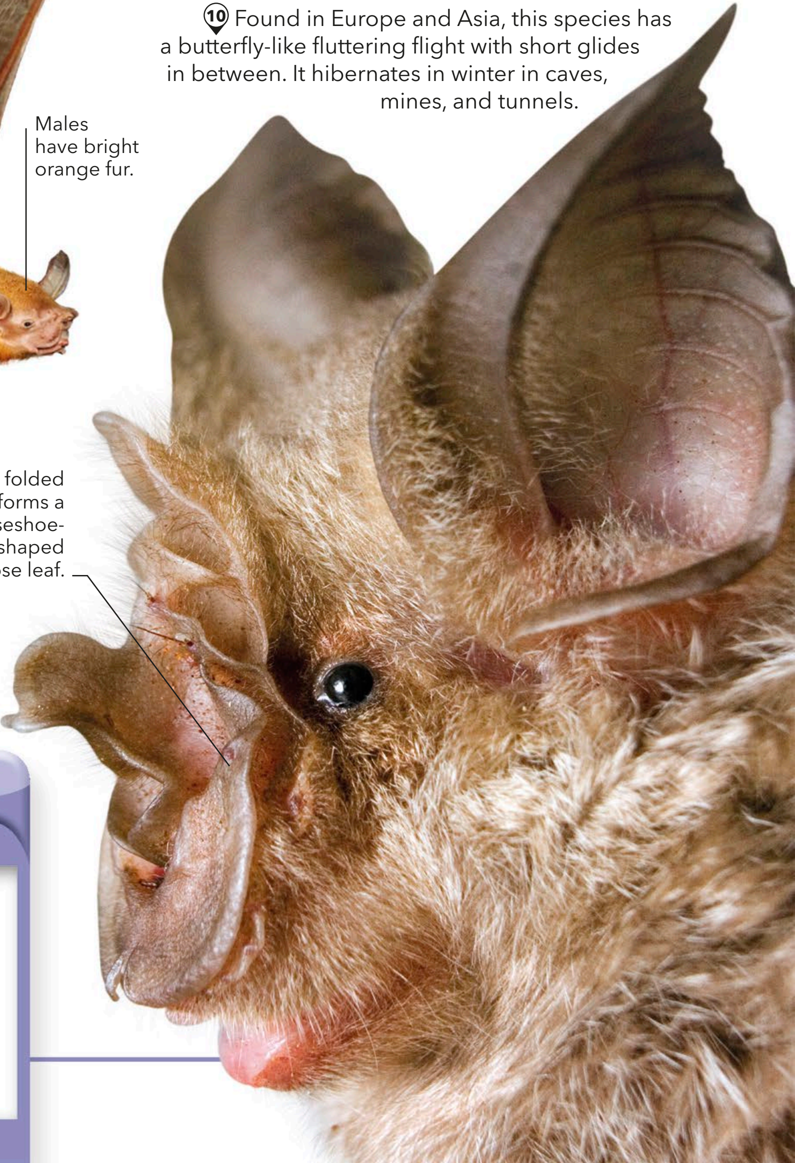
⑧ Found near bodies of water in Central and South America, this bat feeds almost exclusively on fish. Using its large feet, it can catch up to 30 fish in one night.



The wings are also used to paddle across water.

Males have bright orange fur.

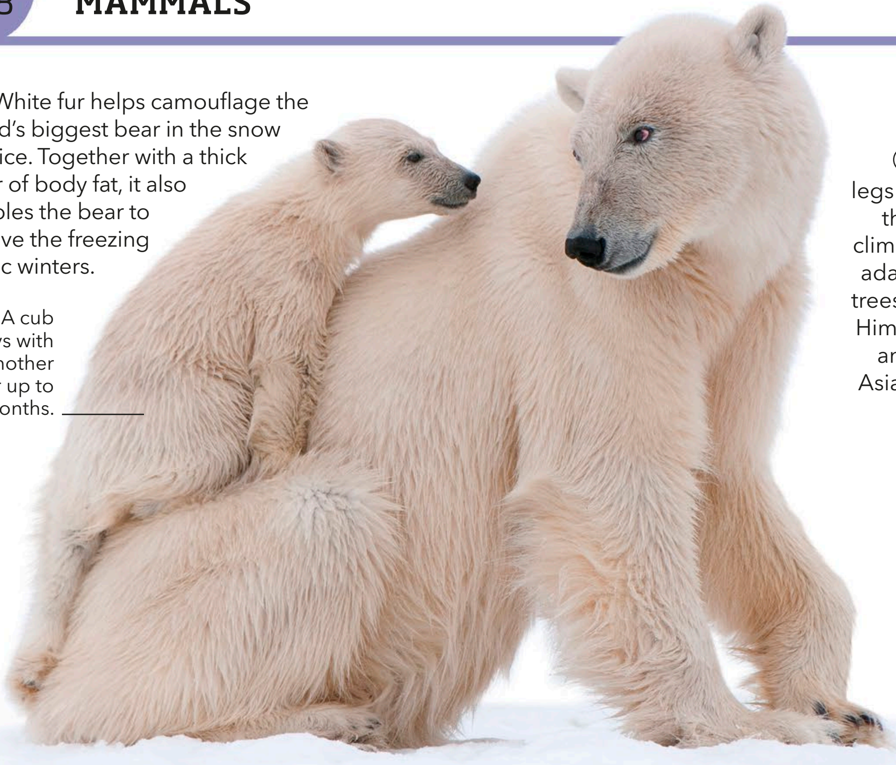
⑩ Found in Europe and Asia, this species has a butterfly-like fluttering flight with short glides in between. It hibernates in winter in caves, mines, and tunnels.



Bare, folded skin forms a horseshoe-shaped nose leaf.

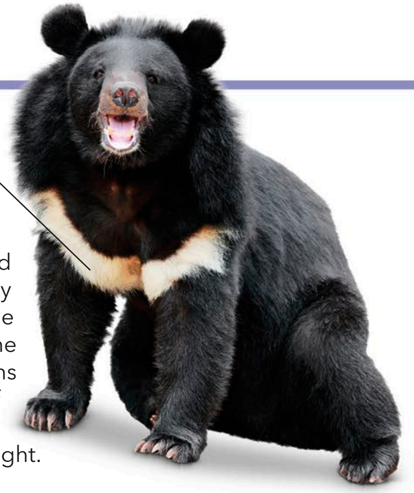
TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Honduran white bat Townsend's big-eared bat Ghost bat Egyptian fruit bat	**Painted bat** **Greater horseshoe bat** **Indian flying fox**	**Greater bulldog bat** **Common pipistrelle** **Common vampire bat**



① White fur helps camouflage the world's biggest bear in the snow and ice. Together with a thick layer of body fat, it also enables the bear to survive the freezing Arctic winters.

A cub stays with the mother for up to 30 months.



White patch on chest

② With strong legs and long claws, this bear is a good climber and perfectly adapted to life in the trees. It is found in the Himalayan mountains and other parts of Asia. It mostly hunts and feeds at night.

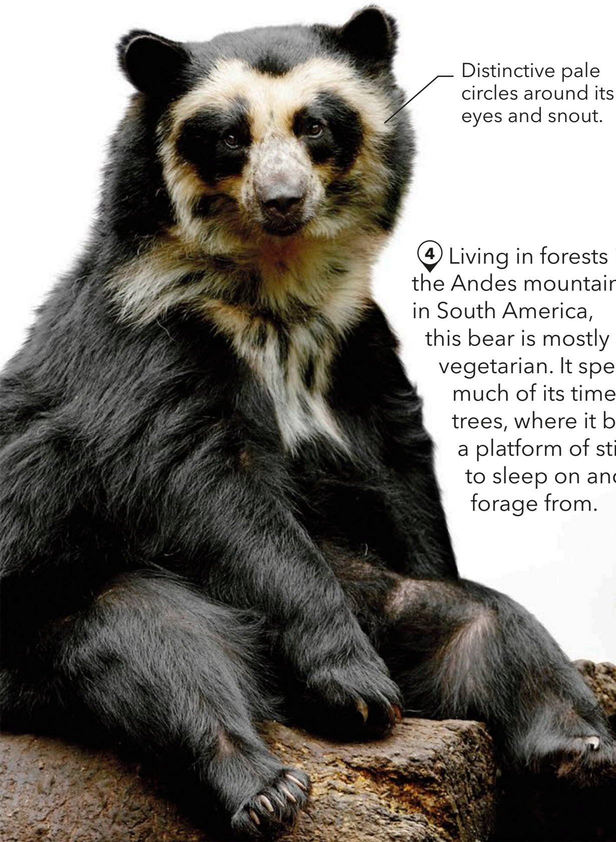
Bear facts

Legendary for their size and strength, bears use their brains and brawn to survive in the wild. These heavily built creatures have large heads, short tails, and strong limbs, which can often kill with a single, powerful blow.

③ Found only in China, this endangered bear spends 16 hours each day eating up to 38 kg (84 lb) of bamboo shoots, its main food.

Strong jaw and cheek muscles help it to crunch on the tough bamboo.

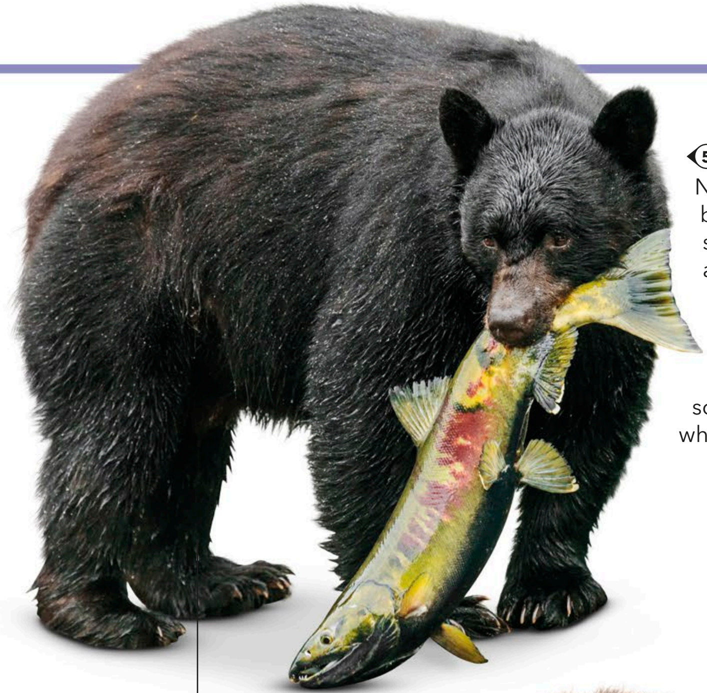
Black and white fur gives good camouflage among the shadowy forest trees.



Distinctive pale circles around its eyes and snout.

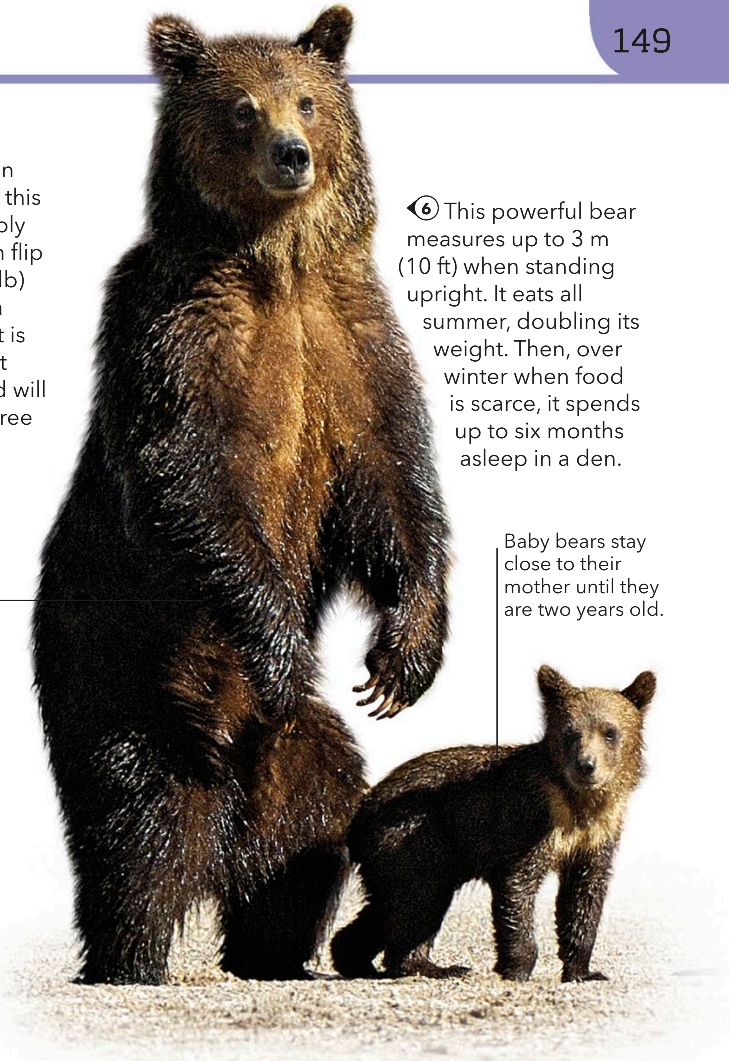
④ Living in forests in the Andes mountains in South America, this bear is mostly vegetarian. It spends much of its time in trees, where it builds a platform of sticks to sleep on and forage from.

ANSWERS: 1. Polar bear 2. Asiatic black bear 3. Giant panda 4. Spectacled bear 5. American black bear 6. Grizzly bear 7. Kodiak bear 8. Sloth bear 9. Sun bear



⑤ Only found in North America, this bear is incredibly strong and can flip a 140 kg (308 lb) boulder with a single paw. It is an excellent climber and will scramble up a tree when scared.

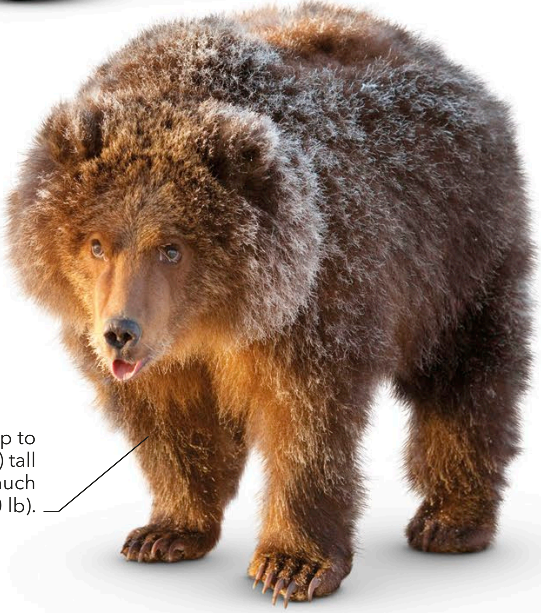
Dark, black-coloured fur



⑥ This powerful bear measures up to 3 m (10 ft) when standing upright. It eats all summer, doubling its weight. Then, over winter when food is scarce, it spends up to six months asleep in a den.

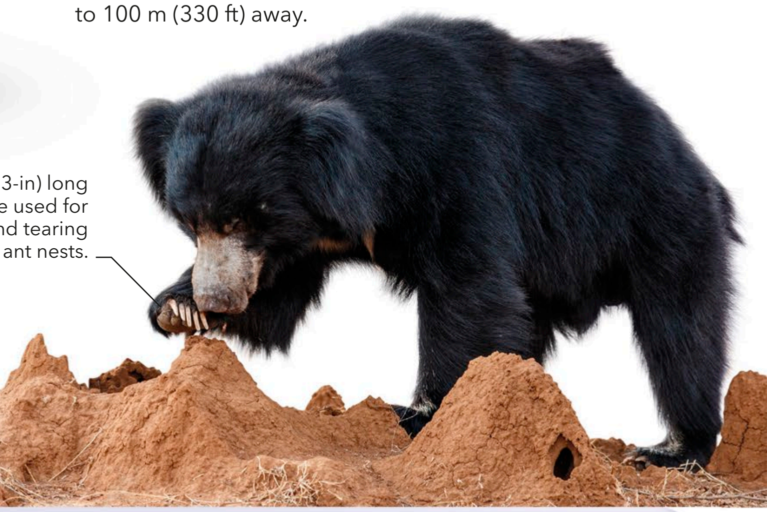
Fur has pale silvery or golden tips.

Baby bears stay close to their mother until they are two years old.



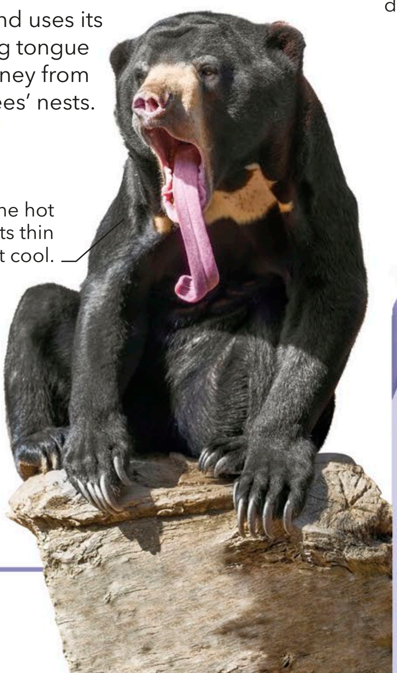
⑦ Native to Alaska, this is the biggest brown bear in the world. It mainly hunts salmon, but also eats berries, grass, and occasionally elk.

It grows up to 3.25 m (10½ ft) tall and weighs as much as 680 kg (1,500 lb).



⑧ This bear lives in the forests of India. Using its protruding lips to suck up ants and termites, it makes slurping sounds that can be heard up to 100 m (330 ft) away.

8-cm (3-in) long claws are used for digging and tearing open ant nests.



⑨ Weighing just 68 kg (150 lb), this bear is the smallest in the world. It lives in the rainforests of Southeast Asia and uses its 25-cm (9¾-in) long tongue to extract honey from bees' nests.

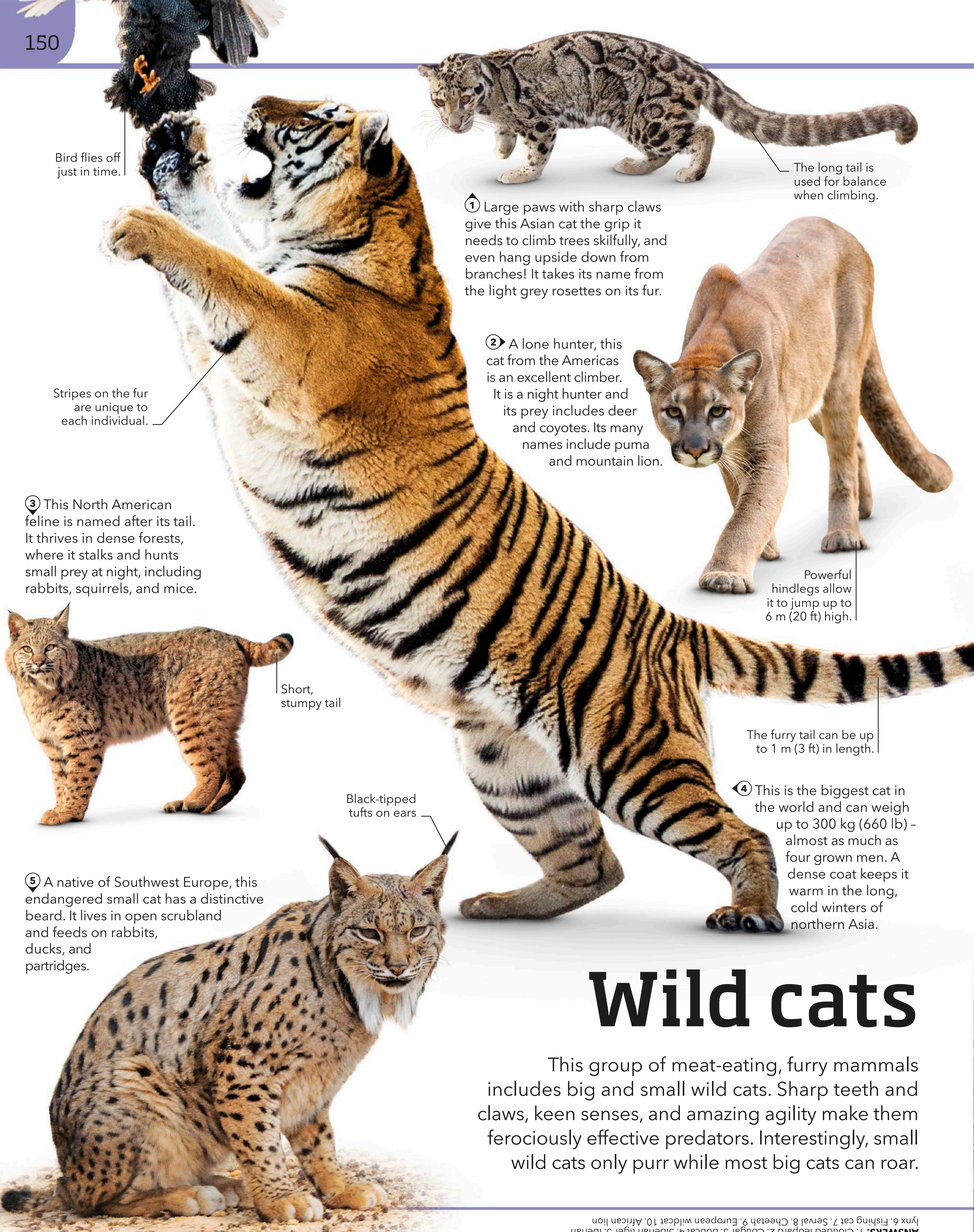
In the hot tropics, its thin fur keeps it cool.

TEST YOURSELF

STARTER	CHALLENGER	GENIUS!
Giant panda	**Sloth bear**	**Sun bear**
Polar bear	**American black bear**	**Spectacled bear**
Grizzly bear	**Asiatic black bear**	**Kodiak bear**

Wild cats

This group of meat-eating, furry mammals includes big and small wild cats. Sharp teeth and claws, keen senses, and amazing agility make them ferociously effective predators. Interestingly, small wild cats only purr while most big cats can roar.



The long tail is used for balance when climbing.

① Large paws with sharp claws give this Asian cat the grip it needs to climb trees skilfully, and even hang upside down from branches! It takes its name from the light grey rosettes on its fur.

② A lone hunter, this cat from the Americas is an excellent climber. It is a night hunter and its prey includes deer and coyotes. Its many names include puma and mountain lion.

Powerful hindlegs allow it to jump up to 6 m (20 ft) high.

Bird flies off just in time.

Stripes on the fur are unique to each individual.

The furry tail can be up to 1 m (3 ft) in length.

④ This is the biggest cat in the world and can weigh up to 300 kg (660 lb) – almost as much as four grown men. A dense coat keeps it warm in the long, cold winters of northern Asia.

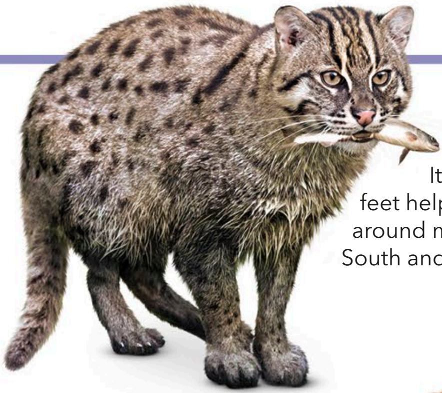
③ This North American feline is named after its tail. It thrives in dense forests, where it stalks and hunts small prey at night, including rabbits, squirrels, and mice.

Short, stumpy tail

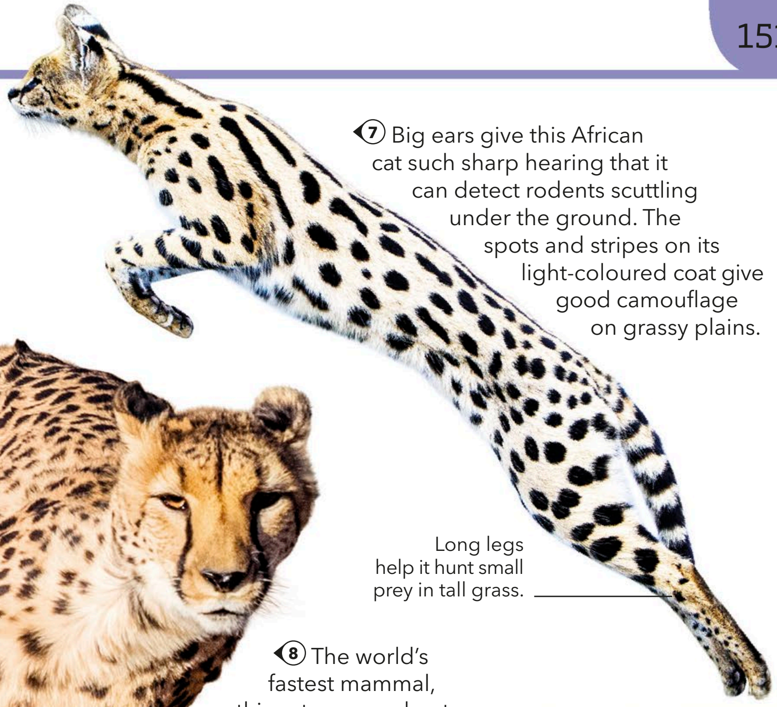
⑤ A native of Southwest Europe, this endangered small cat has a distinctive beard. It lives in open scrubland and feeds on rabbits, ducks, and partridges.

Black-tipped tufts on ears

ANSWERS: 1. Clouded leopard 2. Cougar 3. Bobcat 4. Siberian tiger 5. Iberian lynx 6. Fishing cat 7. Serval 8. Cheetah 9. European wildcat 10. African lion

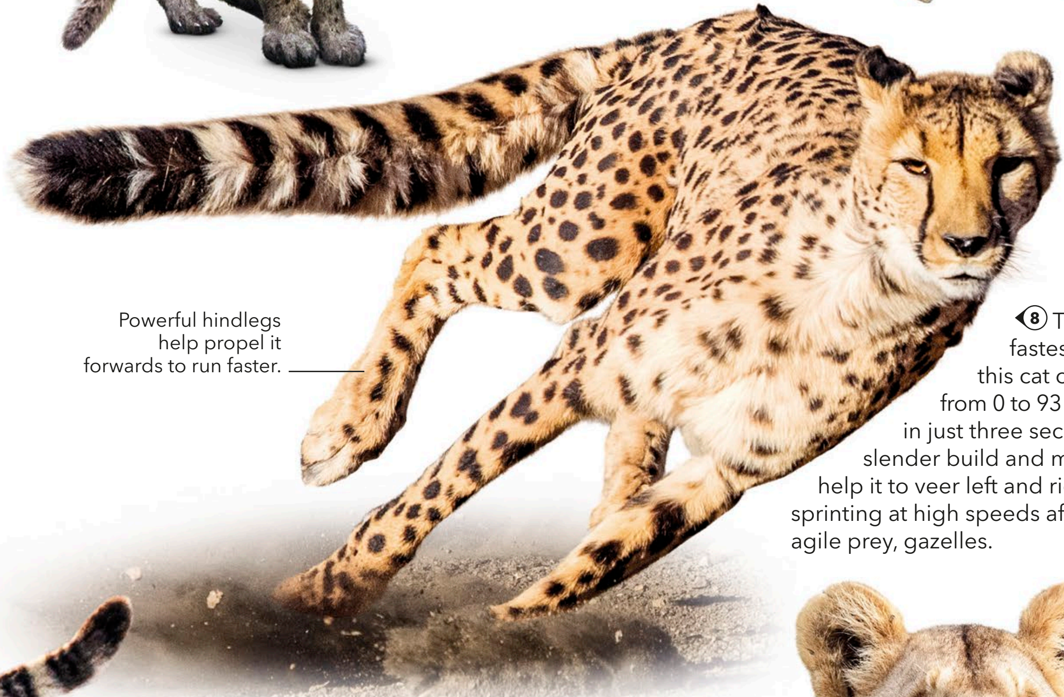


⑥ This stocky cat loves the water. Its partially webbed feet help it swim and walk around muddy wetlands in South and Southeast Asia.



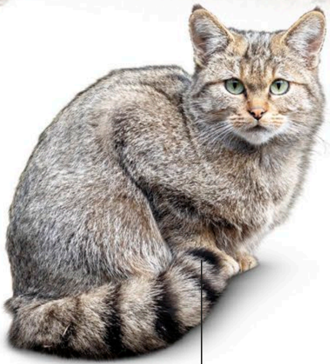
⑦ Big ears give this African cat such sharp hearing that it can detect rodents scuttling under the ground. The spots and stripes on its light-coloured coat give good camouflage on grassy plains.

Long legs help it hunt small prey in tall grass.



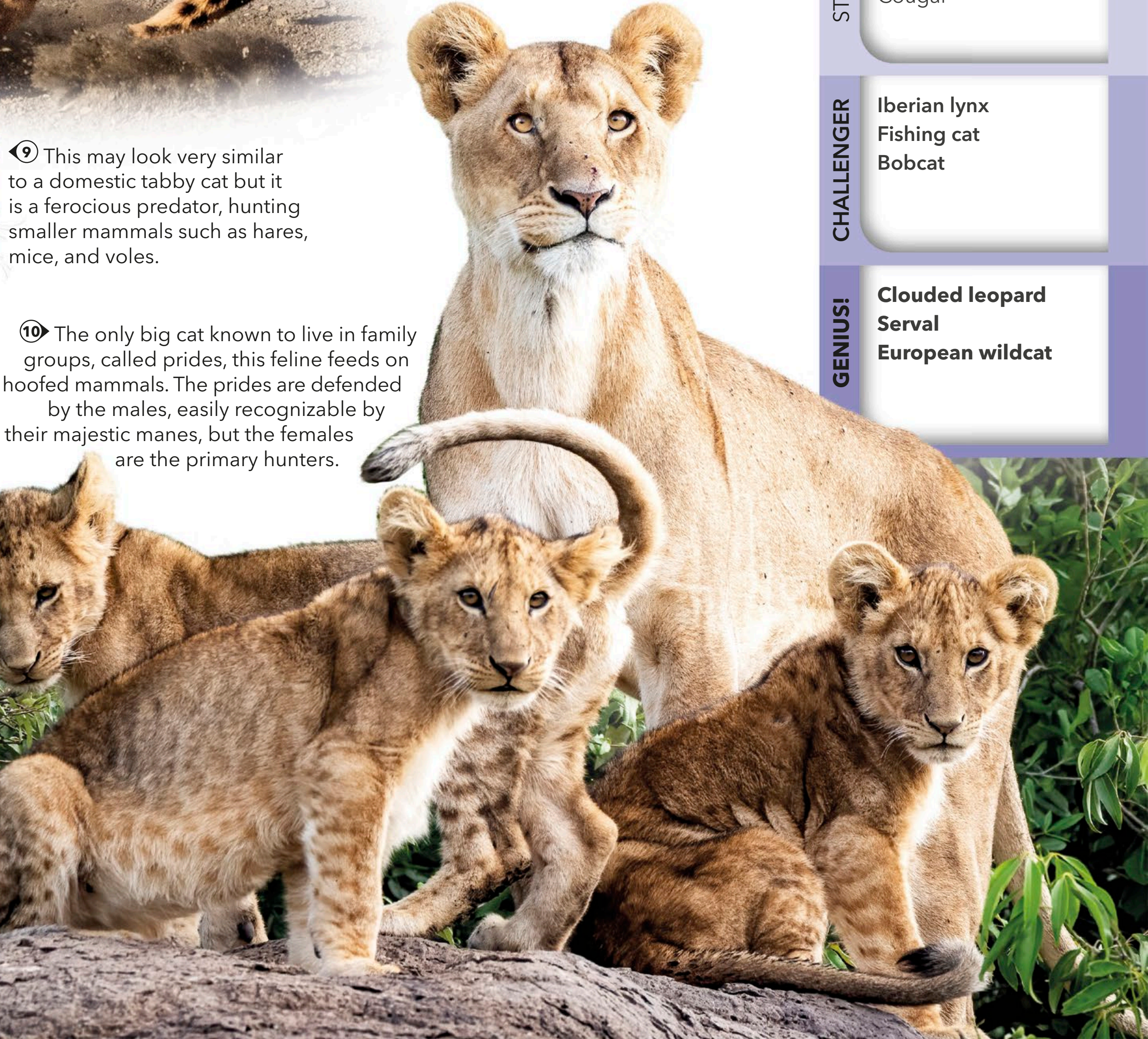
Powerful hindlegs help propel it forwards to run faster.

⑧ The world's fastest mammal, this cat can accelerate from 0 to 93 km/h (58 mph) in just three seconds! Its slender build and muscular tail help it to veer left and right while sprinting at high speeds after its most agile prey, gazelles.



⑨ This may look very similar to a domestic tabby cat but it is a ferocious predator, hunting smaller mammals such as hares, mice, and voles.

Its bushy, ringed tail has a blunt, black tip.



⑩ The only big cat known to live in family groups, called prides, this feline feeds on hoofed mammals. The prides are defended by the males, easily recognizable by their majestic manes, but the females are the primary hunters.

TEST YOURSELF

STARTER

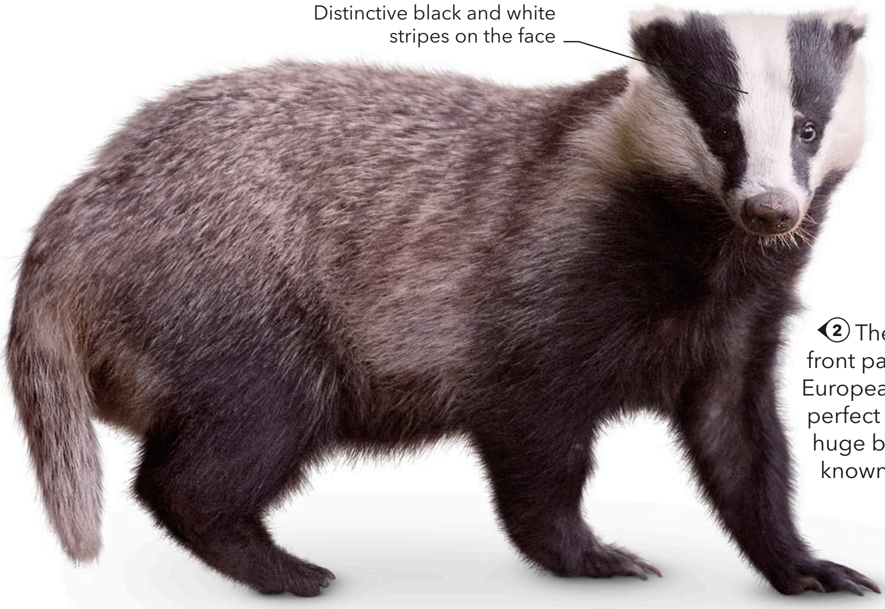
African lion
Siberian tiger
Cheetah
Cougar

CHALLENGER

Iberian lynx
Fishing cat
Bobcat

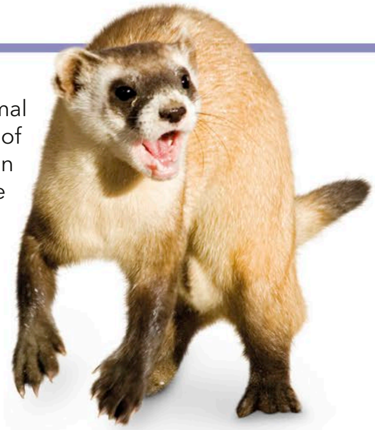
GENIUS!

Clouded leopard
Serval
European wildcat

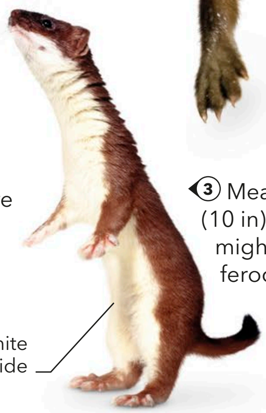


Distinctive black and white stripes on the face

① This endangered mammal moves into the burrows of prairie dogs and preys on them. It is identifiable by the mask-like patches that frame its eyes, and its black feet.



② The strong front paws of this European animal are perfect for digging huge burrows known as setts.



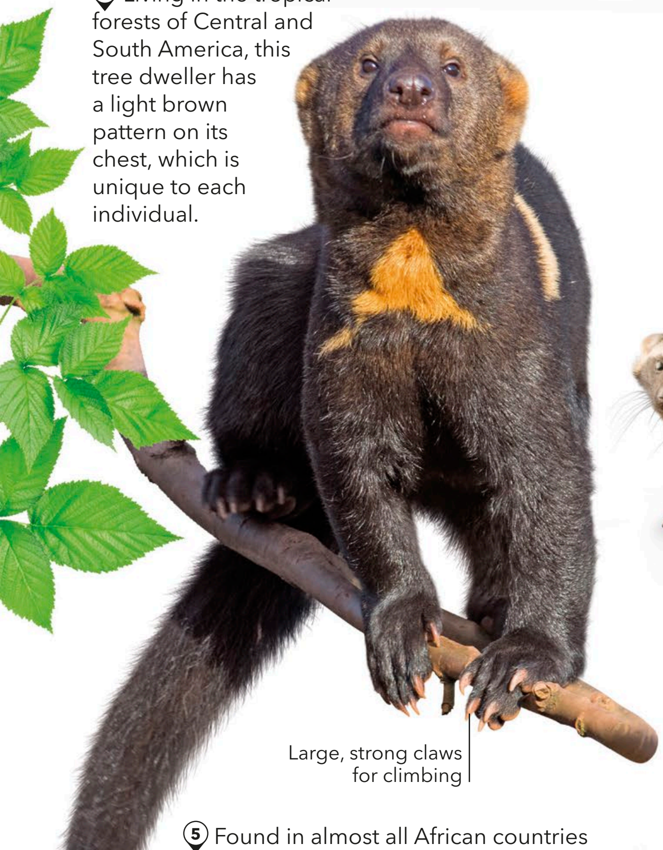
White underside

③ Measuring just 26 cm (10 in) in length, this creature might be small, but it is also ferocious. It can eat more than half of its body weight in one day.

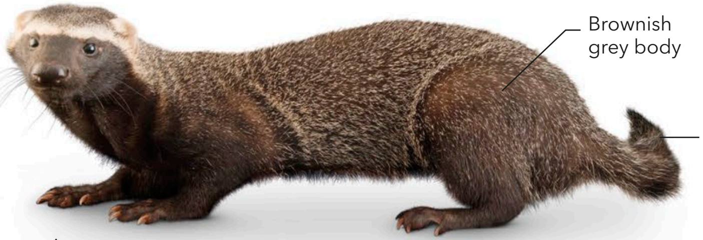
Furry hunters

Despite their harmless appearance, mustelids (members of the weasel family) are formidable predators who can take down prey more than twice their size. Most mustelids are carnivores. They are distant relatives of raccoons and skunks who are omnivores – they will eat anything!

④ Living in the tropical forests of Central and South America, this tree dweller has a light brown pattern on its chest, which is unique to each individual.



Large, strong claws for climbing

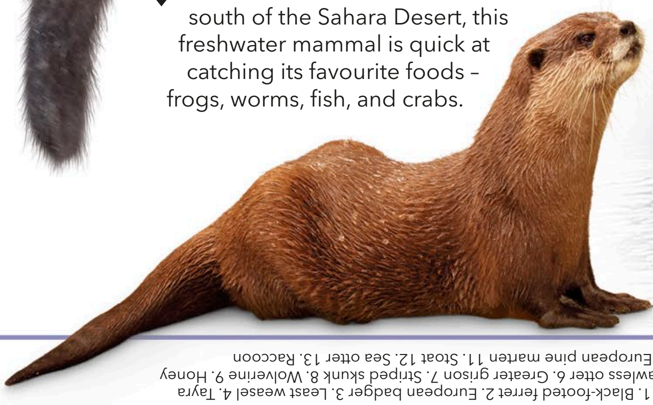


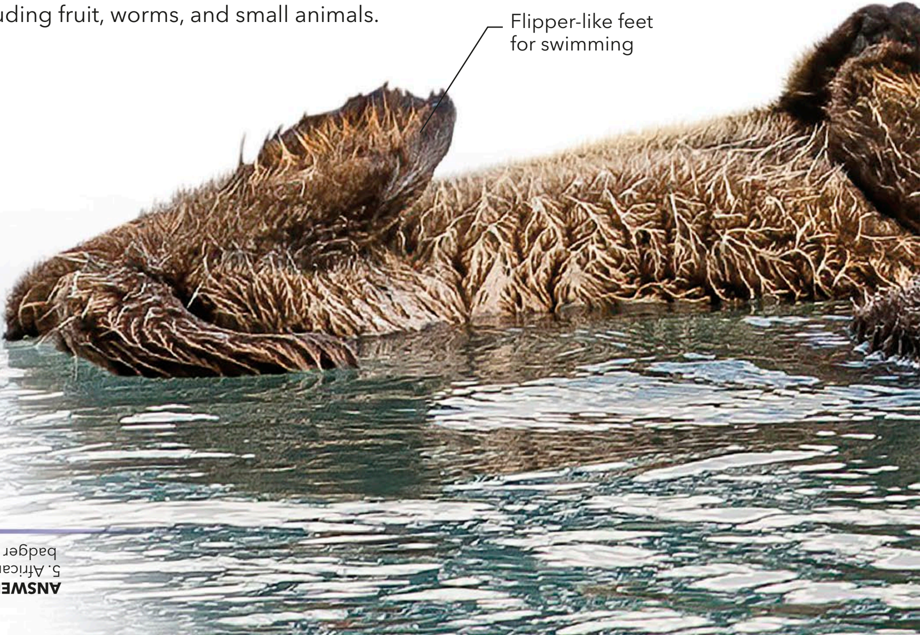
Brownish grey body

The tail helps spread its musk, a substance with a strong smell, to mark its territory.

⑥ This animal has a long body, and a pointy head with a white stripe that runs across its forehead. It eats a range of food including fruit, worms, and small animals.

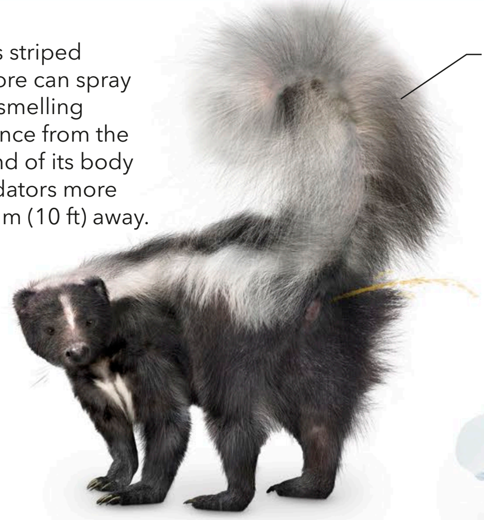
⑤ Found in almost all African countries south of the Sahara Desert, this freshwater mammal is quick at catching its favourite foods – frogs, worms, fish, and crabs.





Flipper-like feet for swimming

ANSWERS: 1. Black-footed ferret 2. European badger 3. Least weasel 4. Tayra 5. African clawless otter 6. Greater grison 7. Striped skunk 8. Wolverine 9. Honey badger 10. European pine marten 11. Stoat 12. Sea otter 13. Raccoon



⑦ This striped carnivore can spray a foul-smelling substance from the rear end of its body at predators more than 3 m (10 ft) away.

The tail is raised as a sign of warning.

Broad feet stop it from sinking in the snow.

⑧ With sharp claws and strong jaws to tear through frozen meat, this solitary hunter can take down prey as large as reindeer. It can grow up to 1.5 m (5 ft) in length.

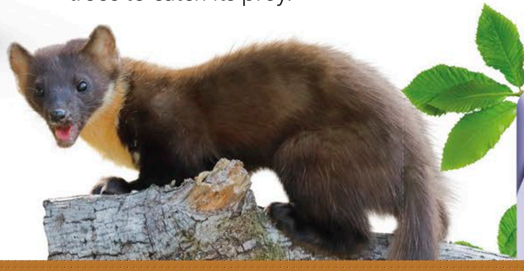
Its thick skin can withstand bee stings.

⑨ Described as the world's most fearless animal, this mustelid likes to pick a fight. Its bite is strong enough to crack a tortoise shell!

Its white winter coat helps it to hide in the snow.

⑪ Slightly larger than a weasel, this animal has been known to mesmerise prey with a dance, before attacking it.

⑩ Found in wooded areas throughout Europe, this animal is named after its preferred tree. It can jump as far as 6 m (20 ft) between trees to catch its prey.



The long, bushy tail helps it balance when leaping.

⑫ This skilful swimmer often sleeps on its back, floating on water. It uses rocks to crack open sea urchins and slurps out the insides.

Air trapped in its thick fur helps it float easily on its back.

⑬ Looking like a masked bandit, many of these North American mammals have moved from the country into the town, where they are often found rummaging through rubbish bins.

TEST YOURSELF

STARTER

- Least weasel
- Sea otter
- European badger
- Raccoon
- Striped skunk

CHALLENGER

- **Wolverine**
- **Honey badger**
- **Black-footed ferret**
- **African clawless otter**

GENIUS!

- **Stoat**
- **Greater grison**
- **Tayra**
- **European pine marten**

⑦ This cunning creature produces fur-filled poo that has a strong, pungent smell and also contains fruit, seeds, bone fragments, and grass.

Cherry stones are often found in the droppings.

⑧ Because this large animal digests less than half of what it eats, its dung is full of partially digested plant matter and straw. The animal produces up to 70 kg (154 lb) of poo every day.

Large, moist blobs become hard and crumbly once dry.

⑩ While defecating, this expert climber likes to wriggle its hips, which results in twisted poo. Dark in colour, the faeces can contain berries, seeds, feathers, and bones.

The black pellets are full of grass.

⑨ This horned mammal stamps on and kicks apart its poo to spread its scent. Its large, rounded poo is full of fibrous plant matter.

⑪ The soft, pea-sized droppings of this small, long-eared animal are found in clusters. It produces edible poo at night, and eats it directly out of the anus!

⑫ Filled with bamboo, this endangered animal's poo is yellow or green depending on whether it has been eating the stem or leaves. This creature can poo up to 40 times a day!

⑬ Dark and cylindrical, this big cat's poo is especially smelly because of its diet of large mammals, such as moose, buffaloes, and deer.

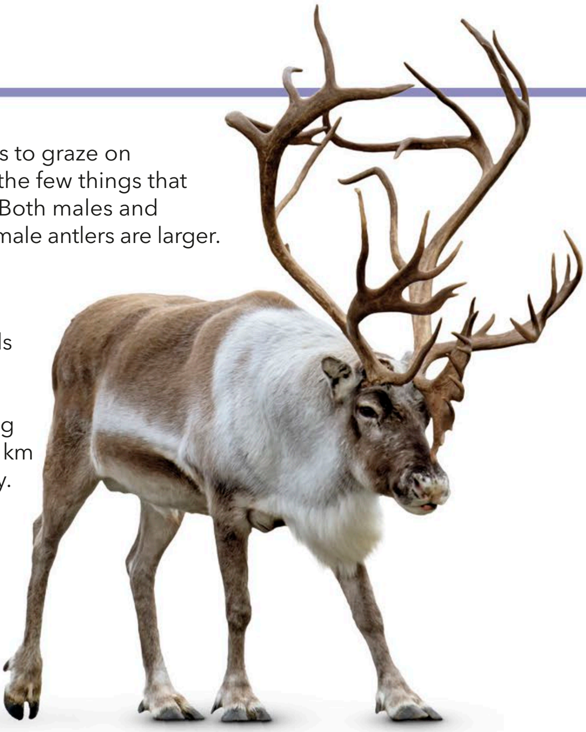
Its shape stops it from rolling away.

⑭ The only animal to have poo that is shaped almost like a cube, this marsupial stacks its dung outside its home to mark its territory.

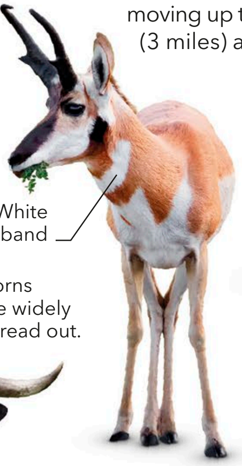
Undigested fur from its prey

Hoofed herds

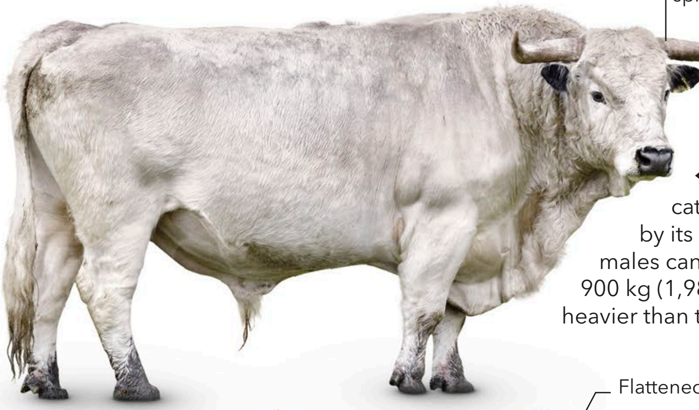
With long legs and hoofed feet, these mammals are fast runners and most live in big groups called herds. Some have horns and others have antlers, both of which come in a wide range of sizes and shapes. While antlers are mainly used to impress or fight male rivals and are shed every year, horns are a permanent feature and may be used to fend off predators.



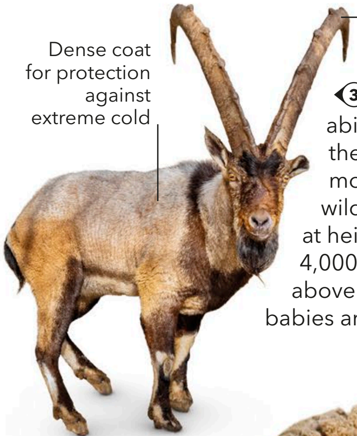
① This Arctic animal likes to graze on moss-like lichen – one of the few things that grow in the cold winters. Both males and females have antlers, but male antlers are larger.



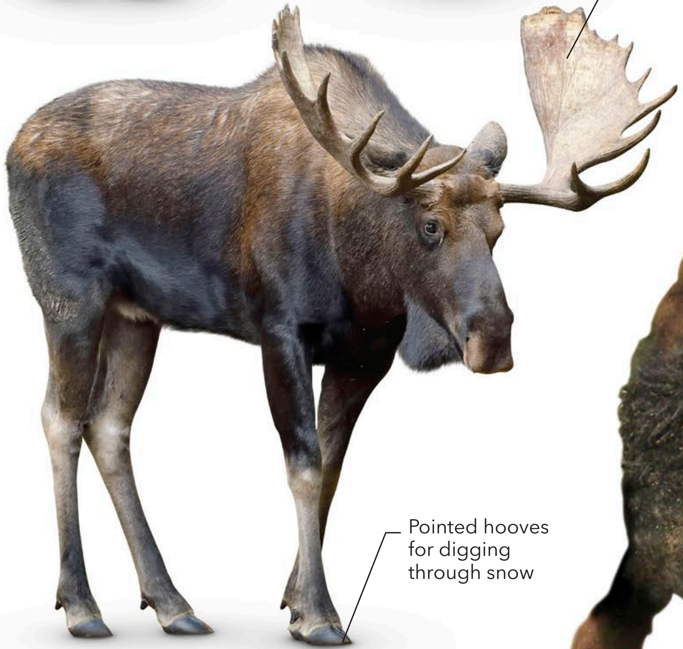
② The only animal with forked horns, which it sheds every year, this mammal has excellent eyesight. It can spot something moving up to 5 km (3 miles) away.



④ This species of cattle can be identified by its all-white coat. Large males can reach a whopping 900 kg (1,984 lb) – five times heavier than the average motorcycle.



③ With the ability to climb the steepest of mountains, this wild animal lives at heights of up to 4,000 m (13,123 ft) above sea level. Its babies are called kids.



⑤ The world's largest deer, this animal from North America and Eurasia stands up to 2 m (6½ ft) tall. Unlike other deer, it usually lives a solitary life.

⑥ To retain water in the hot deserts of the Middle East, this animal's body is able to extract all the moisture from its poo. Its ringed horns are straight and can be up to 76 cm (30 in) in length.

⑦ Living in the Himalayas in Asia, this heavy-set animal is built for the cold. With a double-layered hairy coat, it can tolerate temperatures as low as –40°C (–40°F).

TEST YOURSELF

STARTER

Red deer
White park cattle
Reindeer
Four-horned antelope

CHALLENGER

Moose
Black wildebeest
American bison
Wild goat

GENIUS!

Pronghorn
Dorcas gazelle
Domestic yak
Arabian oryx

White bands on ankles

The two front horns are shorter than the back two.

⑧ This shy animal from Asia has a reddish orange coat and a tiny tail. It is easily recognized by its horns.

Russet-coloured coat

Large ears lose heat to keep the body cool in hot weather.

⑨ The male of this species has impressive, branched antlers. These are used to engage in fierce battles with other males to impress the females during the breeding season.

⑩ Sprinting away at speed is easy for this animal because it has long legs in relation to its body. Living in the northern African deserts, it can go without water for a long time. Its name means "deer" in Greek.

Muscular legs for speed and agility

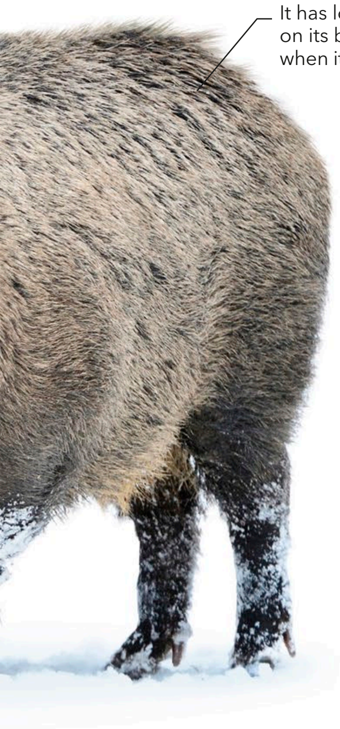
⑫ Named for its dark hair, this African mammal has a tail like a horse, which it uses to swat flies. As seasons change, millions of them migrate across the plains of Africa.

⑪ Despite its vast bulk, this North American animal can run at speeds of up to 60 km/h (35 mph). In the mating season, rival males clash their broad heads together in fierce battles.

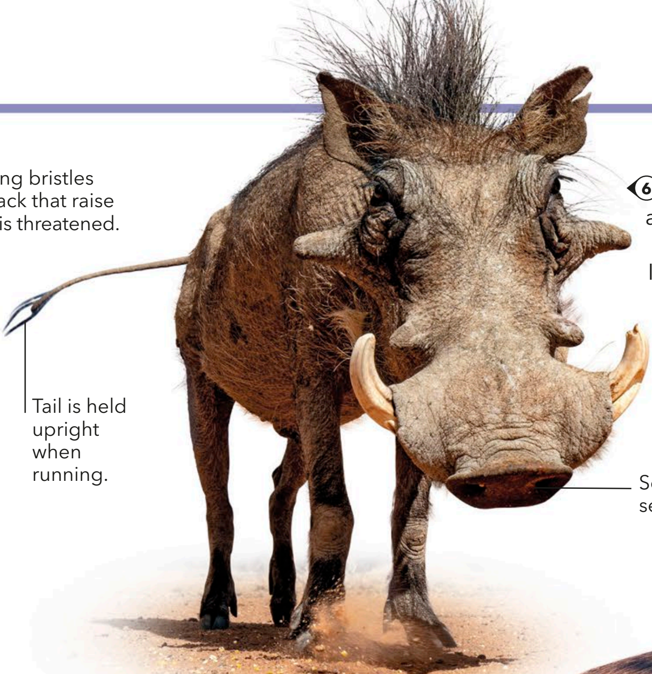
Bristly, black hair along the bridge of its nose.

Rival males clash during the mating season.

ANSWERS: 1. Reindeer 2. Pronghorn 3. Wild goat 4. White park cattle 5. Moose 6. Arabian oryx 7. Domestic yak 8. Four-horned antelope 9. Red deer 10. Dorcas gazelle 11. American bison 12. Black wildebeest



It has long bristles on its back that raise when it is threatened.



Tail is held upright when running.

⑥ Growths on this animal's face act as padding in fights. It has a pair of tusks on each side – a blunt upper tusk for self-defence, and a sharper lower one for digging out roots.

Sensitive snout for seeking out tasty roots

TEST YOURSELF

STARTER

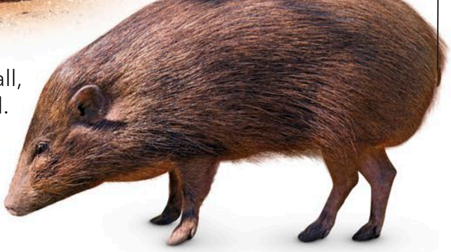
- Common warthog
- Bornean bearded pig
- Wild boar
- Pygmy hog

CHALLENGER

- Red river hog
- Collared peccary
- Giant forest hog

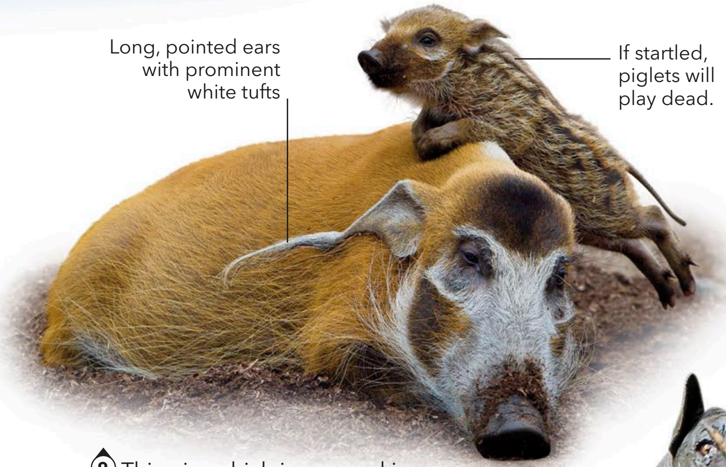
GENIUS!

- **Bush pig**
- **North Sulawesi babirusa**
- **White-lipped peccary**



Small, almost invisible tail

⑦ Standing just 30 cm (12 in) tall, this hog is the smallest in the world. It is native to India and is found in pairs or family groups.

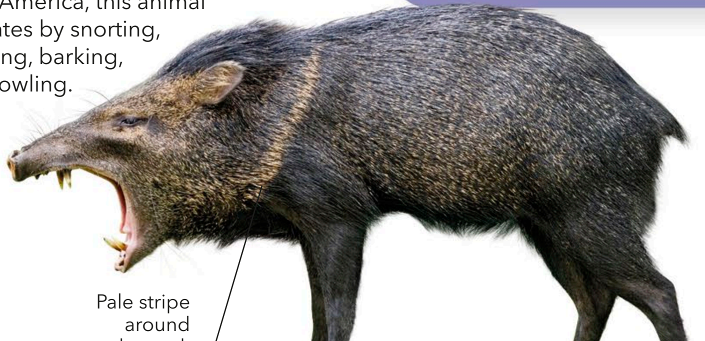


Long, pointed ears with prominent white tufts

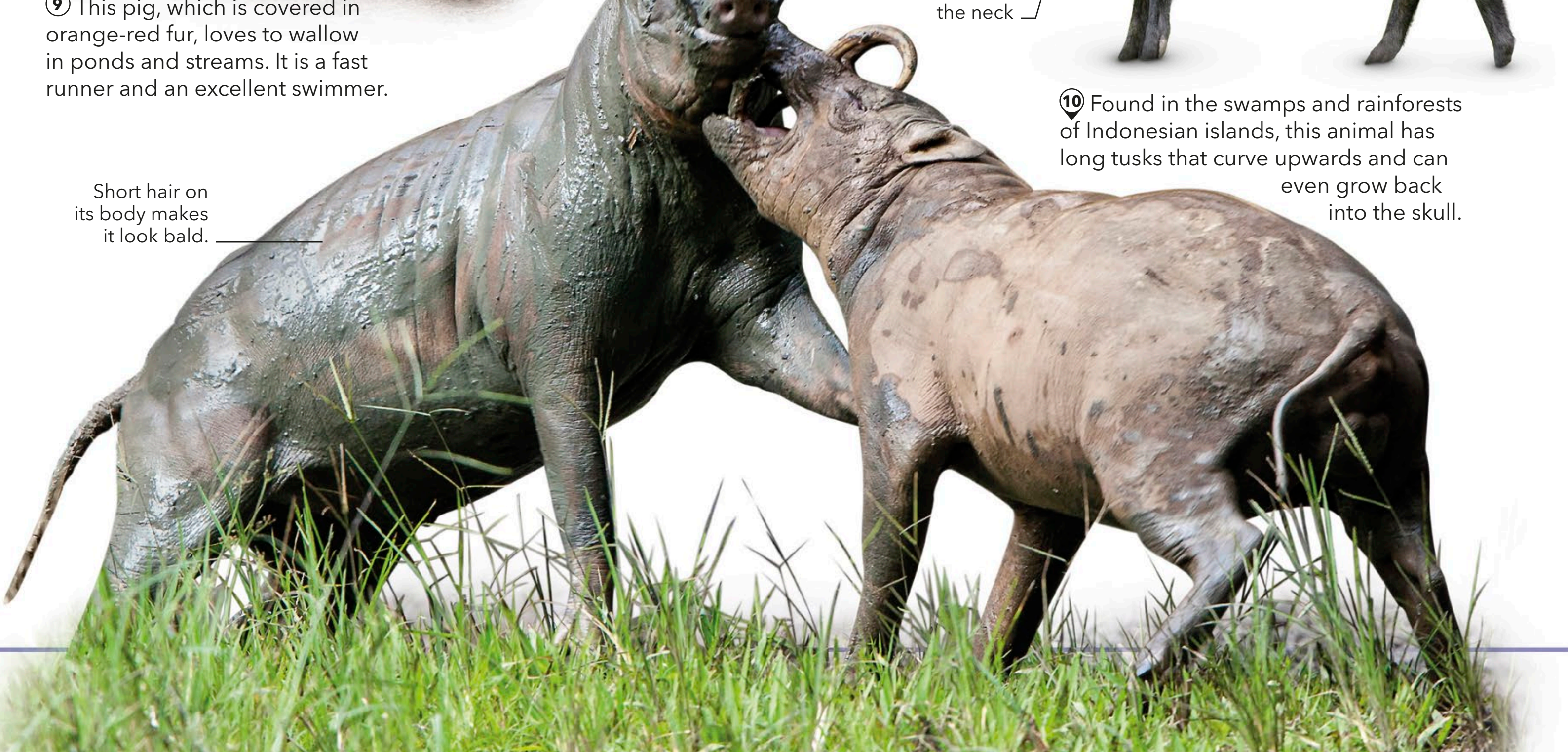
If startled, piglets will play dead.

⑨ This pig, which is covered in orange-red fur, loves to wallow in ponds and streams. It is a fast runner and an excellent swimmer.

⑧ Found from southern USA to South America, this animal communicates by snorting, squealing, barking, and growling.

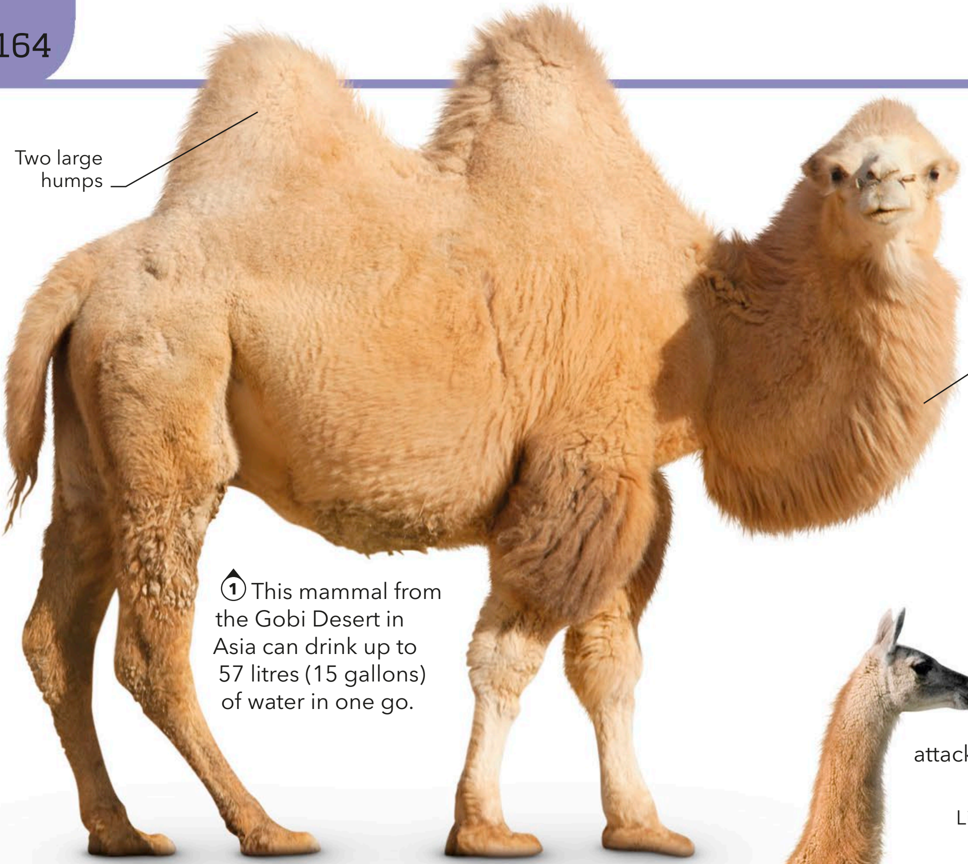


Pale stripe around the neck



⑩ Found in the swamps and rainforests of Indonesian islands, this animal has long tusks that curve upwards and can even grow back into the skull.

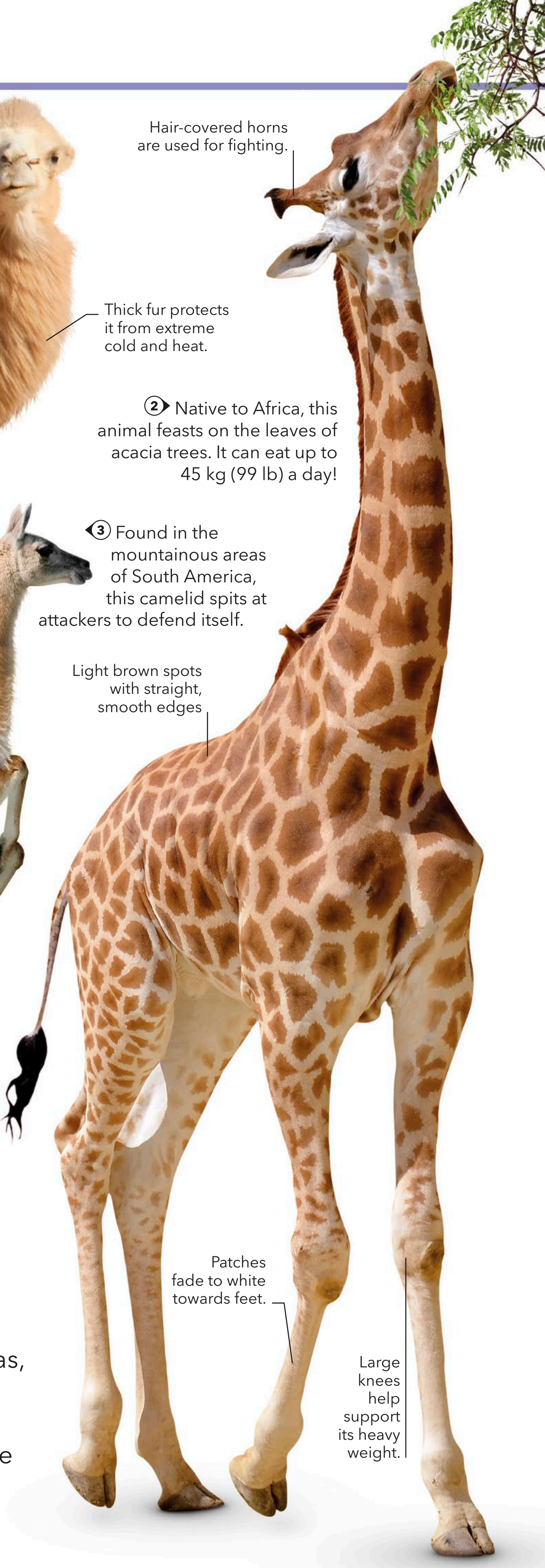
Short hair on its body makes it look bald.



Two large humps

Thick fur protects it from extreme cold and heat.

① This mammal from the Gobi Desert in Asia can drink up to 57 litres (15 gallons) of water in one go.



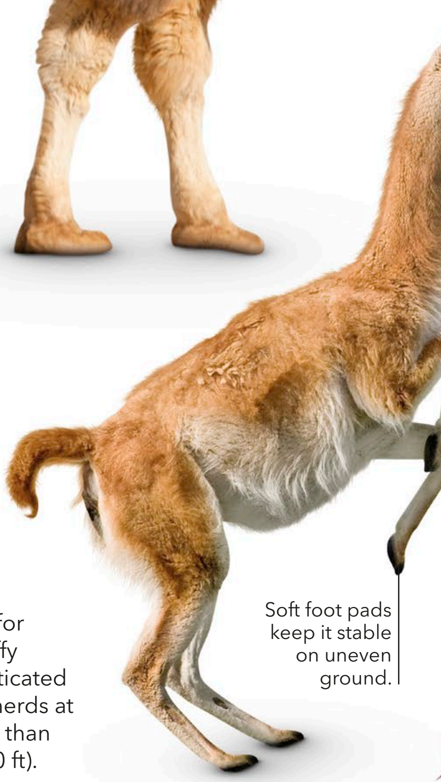
Hair-covered horns are used for fighting.

② Native to Africa, this animal feasts on the leaves of acacia trees. It can eat up to 45 kg (99 lb) a day!

Light brown spots with straight, smooth edges

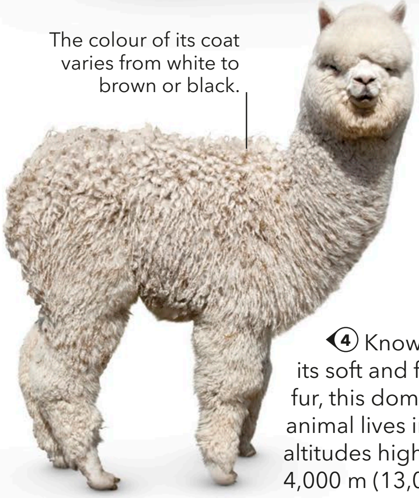
Patches fade to white towards feet.

Large knees help support its heavy weight.



③ Found in the mountainous areas of South America, this camelid spits at attackers to defend itself.

Soft foot pads keep it stable on uneven ground.



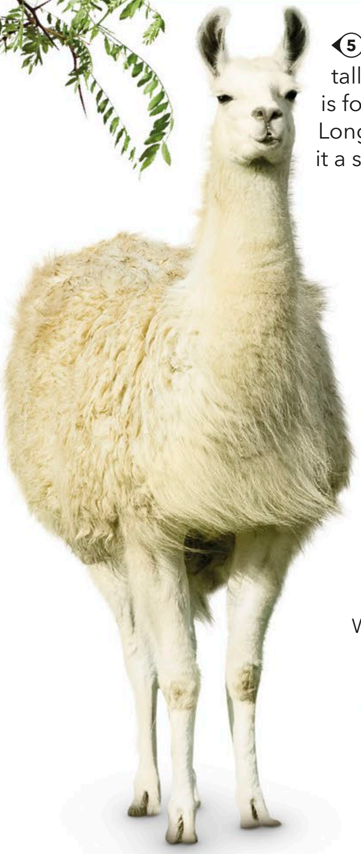
The colour of its coat varies from white to brown or black.

④ Known for its soft and fluffy fur, this domesticated animal lives in herds at altitudes higher than 4,000 m (13,000 ft).

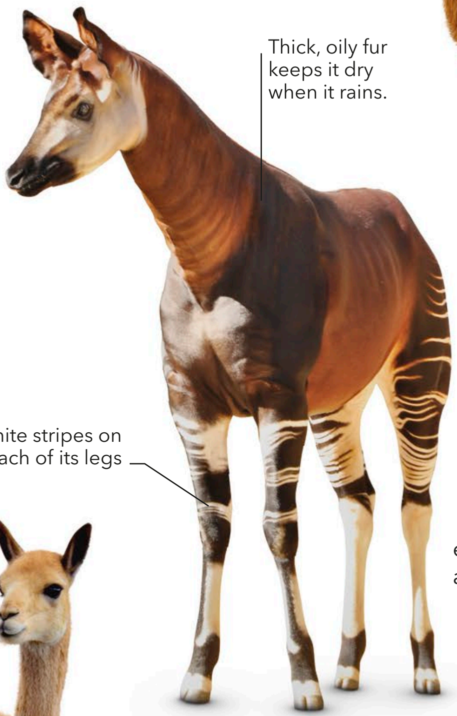
Hooves and humps

Camelids – the family of mammals that includes camels, llamas, and alpacas – and giraffes are perfectly adapted to living in extreme climates, from scorching deserts and hot savannas to freezing mountains. While some have large humps to store fat, others have broad padded hooves to stop them from sinking into the gravel or sand.

ANSWERS: 1. Bactrian camel 2. Northern giraffe 3. Guanaco 4. Alpaca 5. Llama 6. Okapi 7. Dromedary 8. Vicuña 9. Masai giraffe



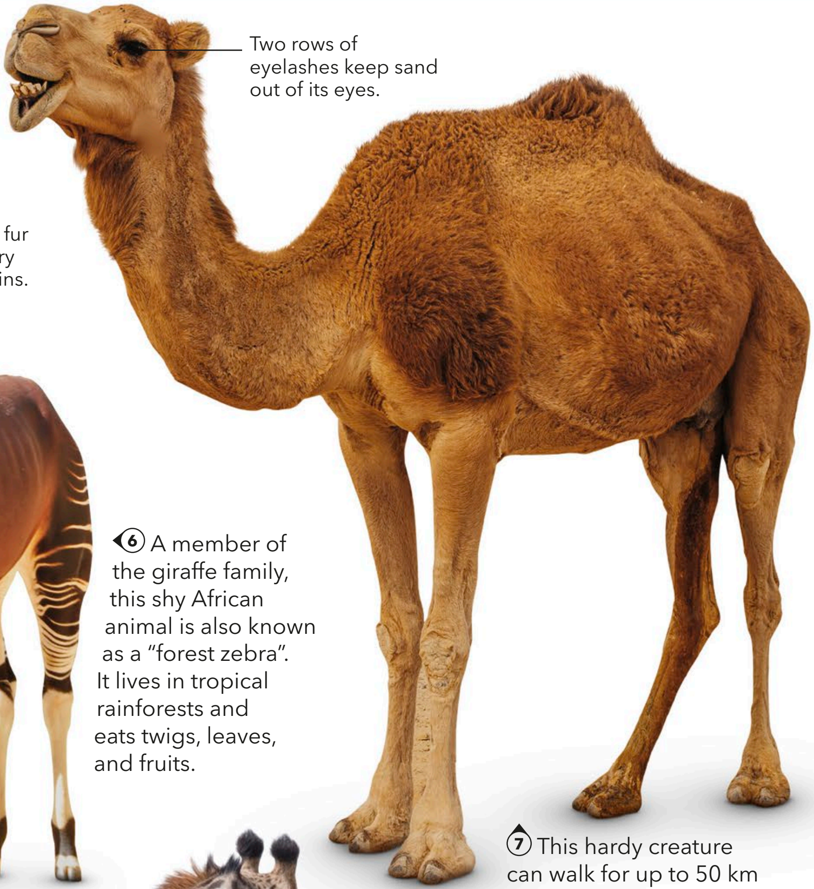
⑤ Standing 1¾ m (6 ft) tall, this domesticated camelid is found in the Andes Mountains. Long, banana-shaped ears give it a sharp sense of hearing.



Thick, oily fur keeps it dry when it rains.

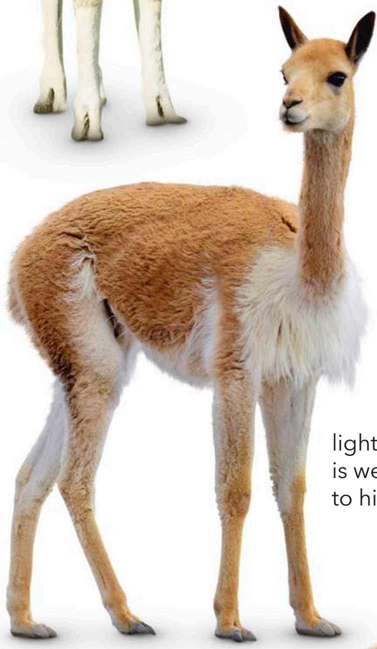
White stripes on each of its legs

⑥ A member of the giraffe family, this shy African animal is also known as a "forest zebra". It lives in tropical rainforests and eats twigs, leaves, and fruits.

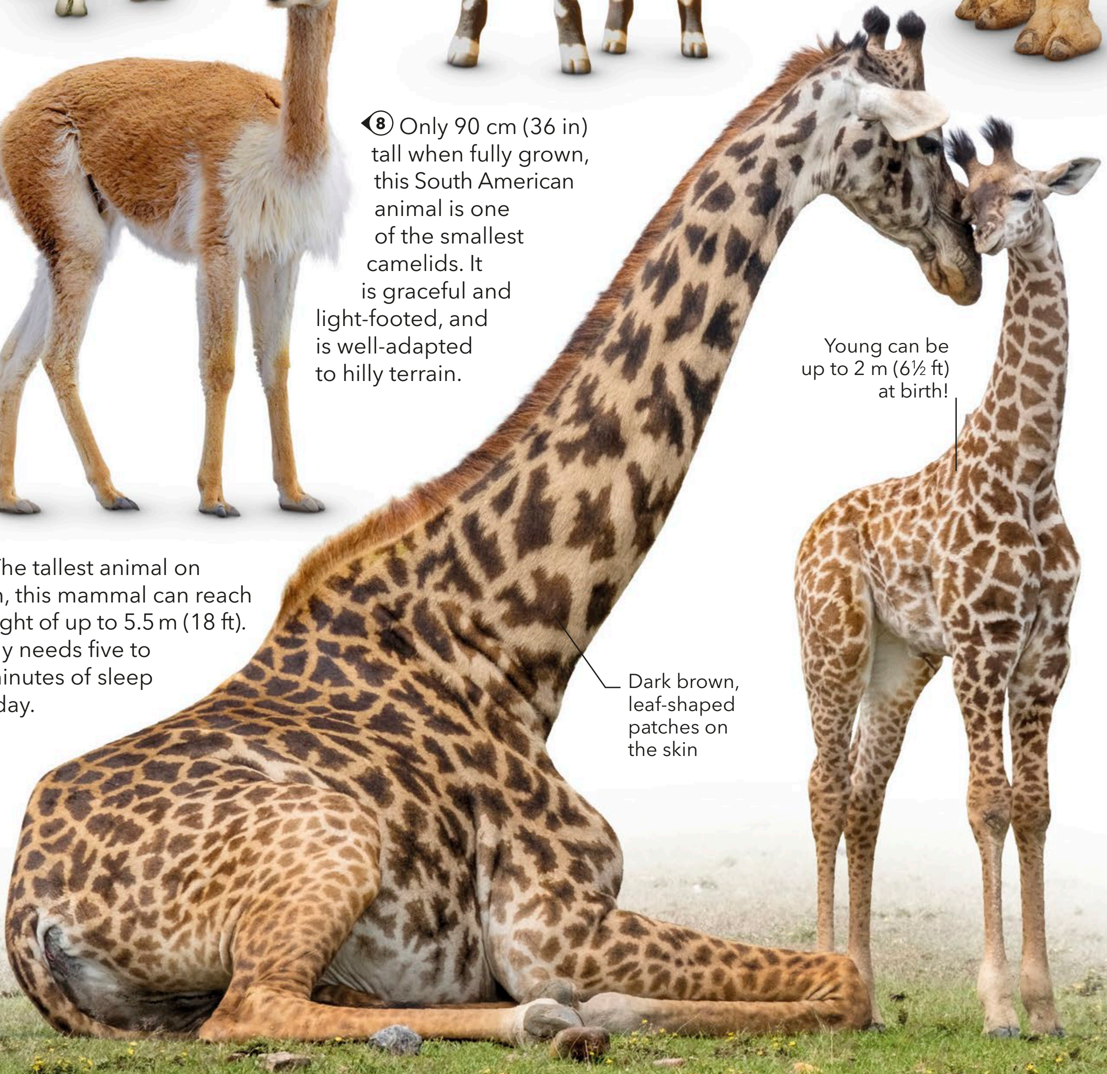


Two rows of eyelashes keep sand out of its eyes.

⑦ This hardy creature can walk for up to 50 km (30 miles) a day. Its tough lips help it pick at hard and thorny desert plants.



⑧ Only 90 cm (36 in) tall when fully grown, this South American animal is one of the smallest camelids. It is graceful and light-footed, and is well-adapted to hilly terrain.



⑨ The tallest animal on Earth, this mammal can reach a height of up to 5.5 m (18 ft). It only needs five to 30 minutes of sleep in a day.

Young can be up to 2 m (6½ ft) at birth!

Dark brown, leaf-shaped patches on the skin

TEST YOURSEFL

STARTER

Llama
Bactrian camel
Masai giraffe

CHALLENGER

Alpaca
Dromedary
Northern giraffe

GENIUS!

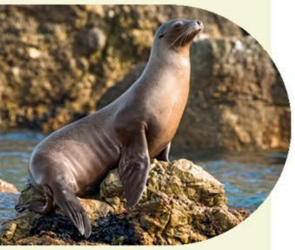
Vicuña
Guanaco
Okapi

Ocean mammals

Masters of the sea, ocean mammals include some of the largest animals on the planet. Unlike other sea creatures, marine mammals do not have gills and need to return to the water's surface to breathe. They also give birth to live young, which they nurse with milk they have produced.

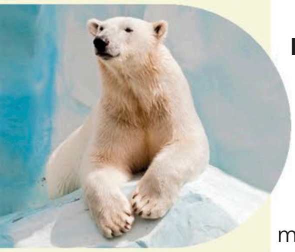
Types of marine mammals

Cetaceans
These mammals live their entire life in the ocean. They come to the surface regularly to breathe, and include whales, dolphins, and porpoises.



Pinnipeds
These fin-footed mammals include seals, sea lions, and walruses. Pinnipeds come to land to breed or to escape predators.

Sirenians
Living primarily in tropical waters where plants grow, sirenians include the manatee and dugong. They are large, slow-moving mammals.



Fissipeds
These are mammals with separated toes. Polar bears and sea otters are considered sea mammals because they rely on the ocean for survival. They are mainly meat eaters.

How to be part of the pod

01. As you swim across the ocean, meet other bottlenose dolphins and travel in groups, or pods. Keep a lookout for superpods of up to 1,000 dolphins, and join forces with them to hunt for fish, squids, or shrimp.

02. Use your unique whistle to identify yourself to another dolphin. Talk to each other in whistles. The sound can even tell them how you are feeling. Once the hunt is over, go back to a smaller pod with new friends.

I don't believe it!

Scientists believe that bowhead whales can live to be more than 200 years old – the longest of any living mammal.

Marine mammal facts

While sleeping, bottlenose dolphins keep one side of their brain awake and alert so that they can watch out for predators.

Bearded seal pups are excellent swimmers and can swim and dive to depths of 200 m (656 ft) within hours of being born.

A polar bear has black skin but transparent hairs which reflect light – this is what makes the fur look white.

California sea lions (pictured) like to play and can often be seen body surfing on the waves.

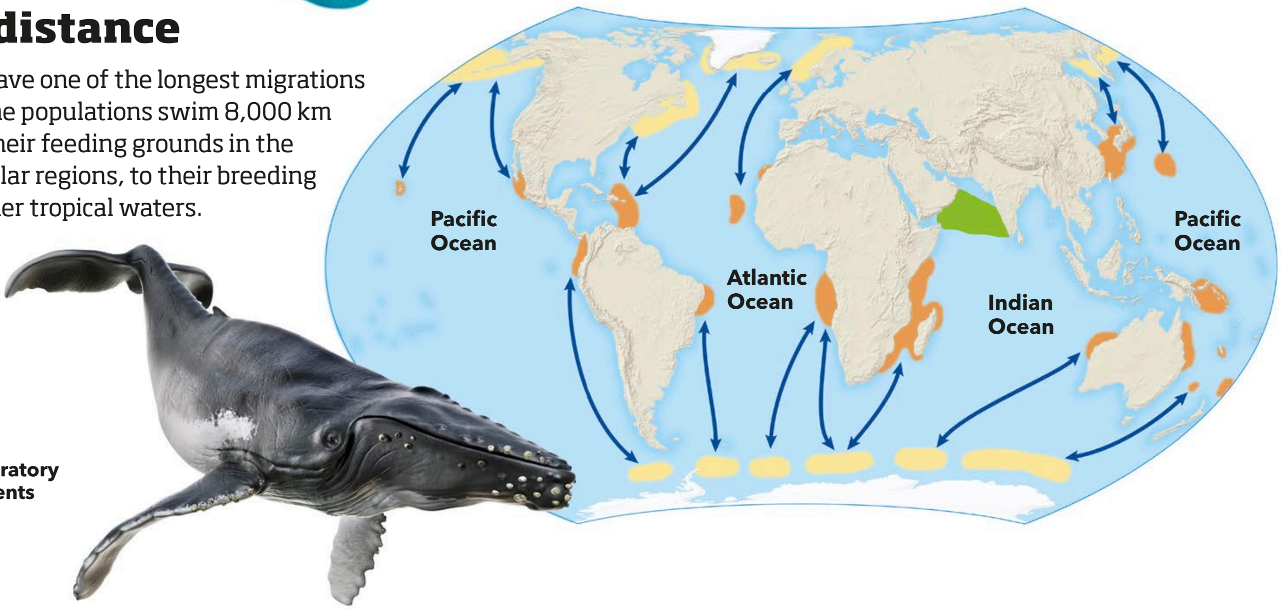
03. Being the social animal you are, hang out with your pals and find the time to play – chase each other, surf the waves, and best of all, blow large bubble rings in the water.

HOLDING ON!

Sea otters wrap kelp, or large seaweed, around themselves to avoid drifting off in the swirling sea currents when they are asleep.

Going the distance

Humpback whales have one of the longest migrations of any mammal. Some populations swim 8,000 km (5,000 miles) from their feeding grounds in the cold waters of the Polar regions, to their breeding grounds in the warmer tropical waters.

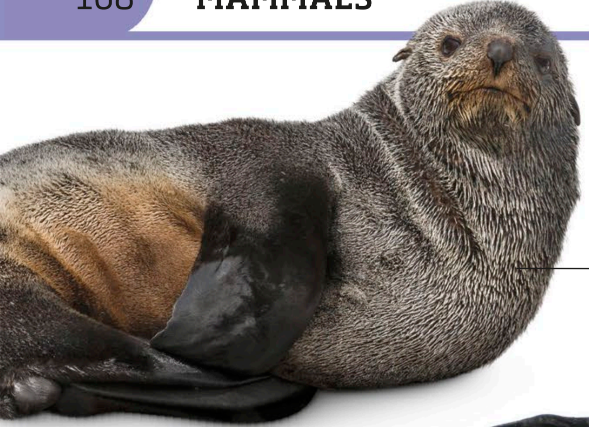


— **Migration routes**

🟧 **Major breeding areas (winter)**

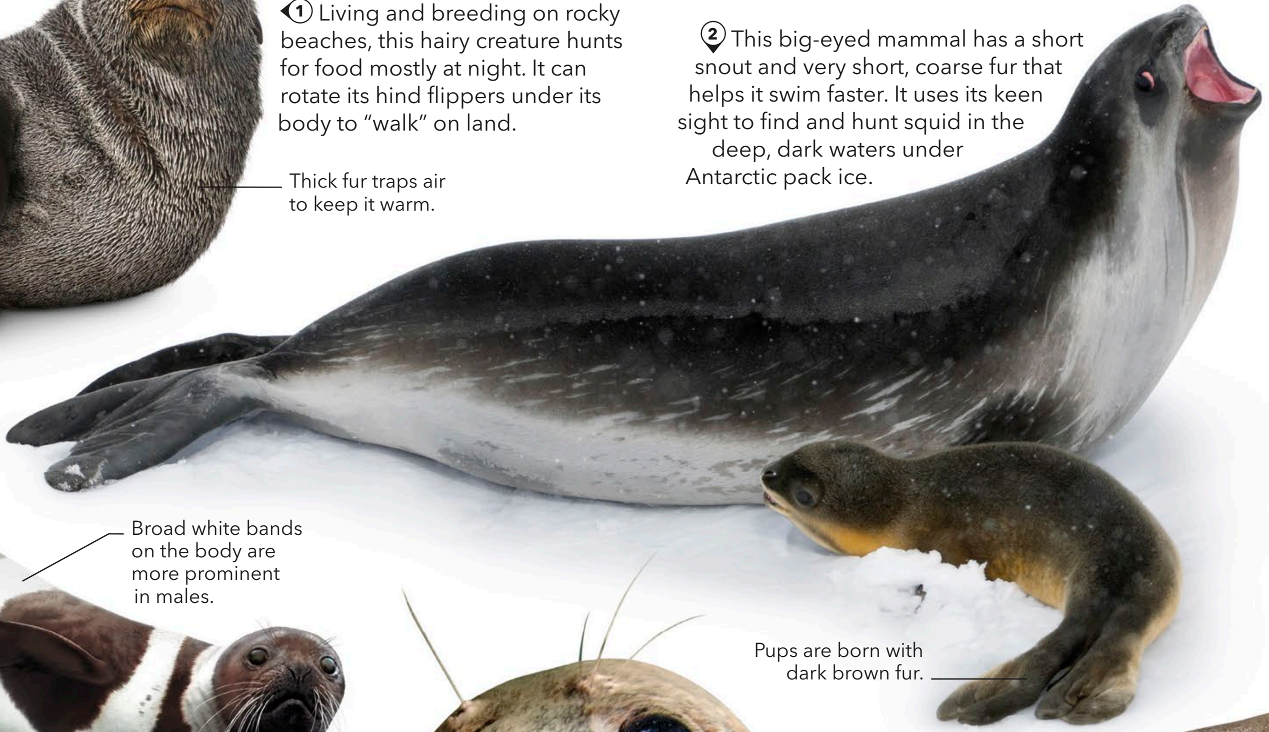
🟨 **Major feeding areas (summer)**

🟩 **Possible non-migratory permanent residents**



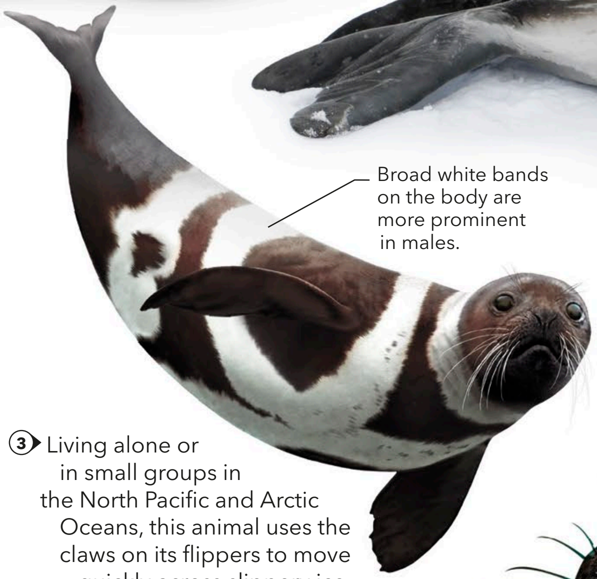
① Living and breeding on rocky beaches, this hairy creature hunts for food mostly at night. It can rotate its hind flippers under its body to "walk" on land.

Thick fur traps air to keep it warm.



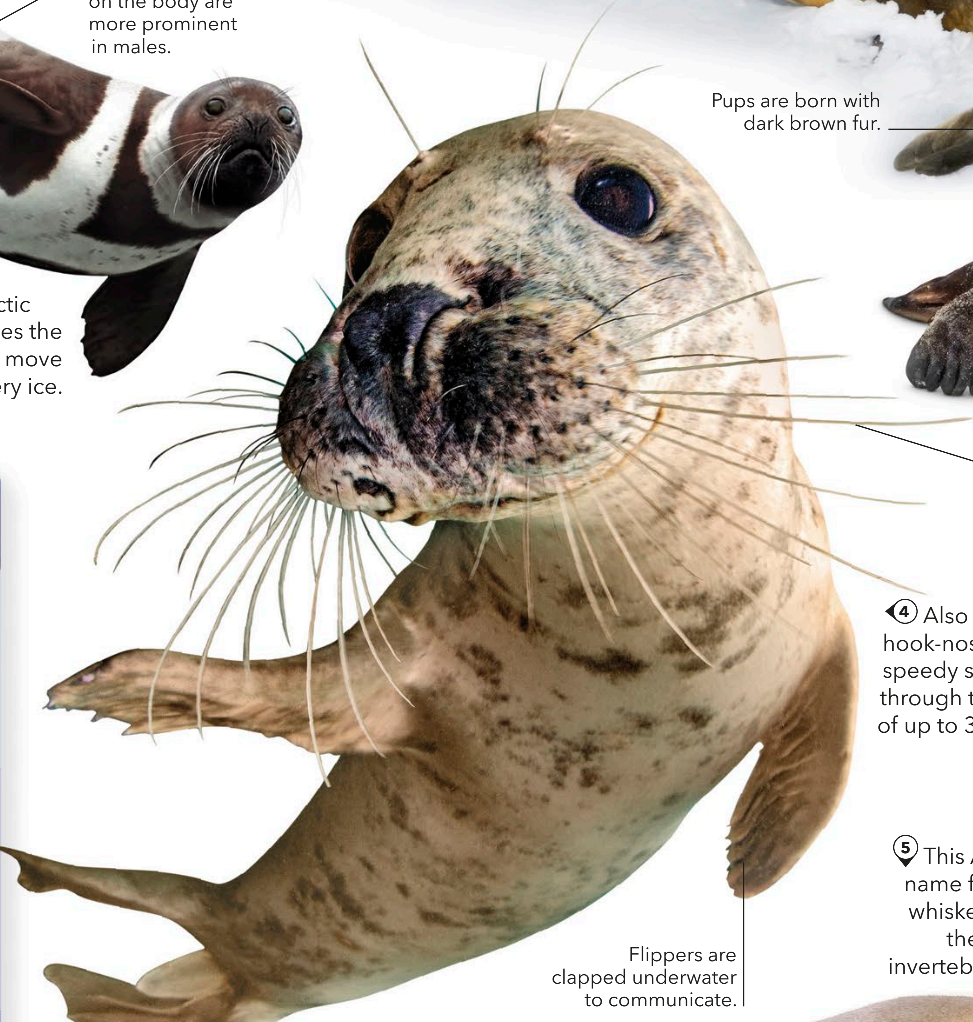
② This big-eyed mammal has a short snout and very short, coarse fur that helps it swim faster. It uses its keen sight to find and hunt squid in the deep, dark waters under Antarctic pack ice.

Pups are born with dark brown fur.



Broad white bands on the body are more prominent in males.

③ Living alone or in small groups in the North Pacific and Arctic Oceans, this animal uses the claws on its flippers to move quickly across slippery ice.

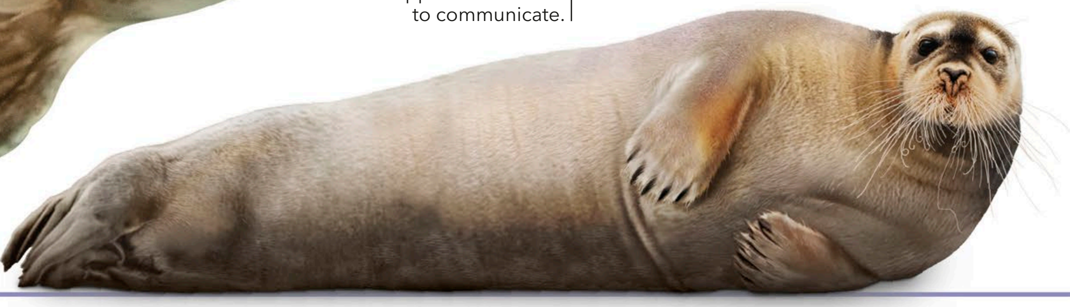


Thick, sensitive whiskers are used to find prey and sense predators.

④ Also known as the hook-nosed sea pig, this speedy swimmer can race through the water at speeds of up to 35 km/h (22 mph).

Flippers are clapped underwater to communicate.

⑤ This Arctic animal gets its name from the long, dense whiskers on its face. It uses them to find clams and invertebrates on the seabed.



TEST YOURSELF

STARTER

- Northern elephant seal
- Grey seal
- Atlantic walrus
- Leopard seal

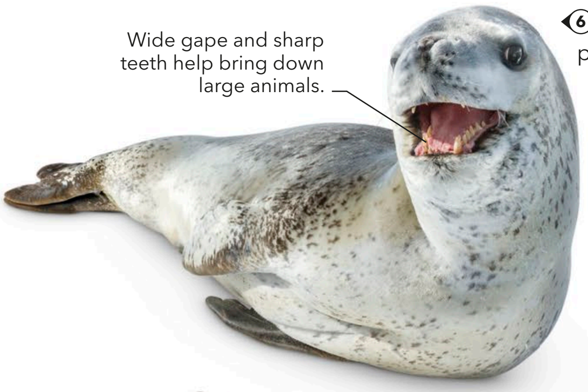
CHALLENGER

- **Hooded seal**
- **Bearded seal**
- **Ribbon seal**

GENIUS!

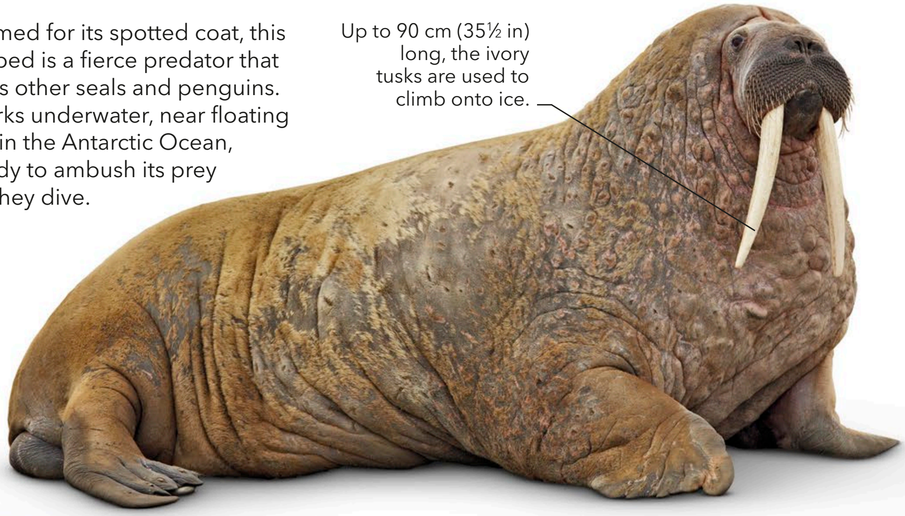
- **South American fur seal**
- **Ross seal**
- **Galápagos sea lion**

ANSWERS: 1. South American fur seal 2. Ross seal 3. Ribbon seal 4. Grey seal 5. Bearded seal 6. Leopard seal 7. Galápagos sea lion 8. Hooded seal 9. Atlantic walrus 10. Northern elephant seal

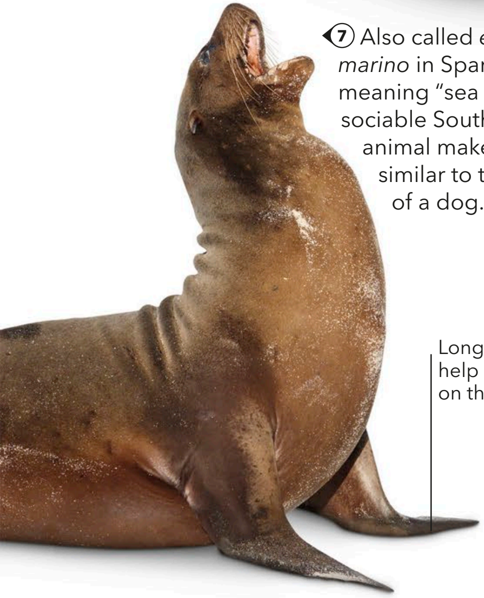


Wide gape and sharp teeth help bring down large animals.

⑥ Named for its spotted coat, this pinniped is a fierce predator that hunts other seals and penguins. It lurks underwater, near floating ice in the Antarctic Ocean, ready to ambush its prey as they dive.

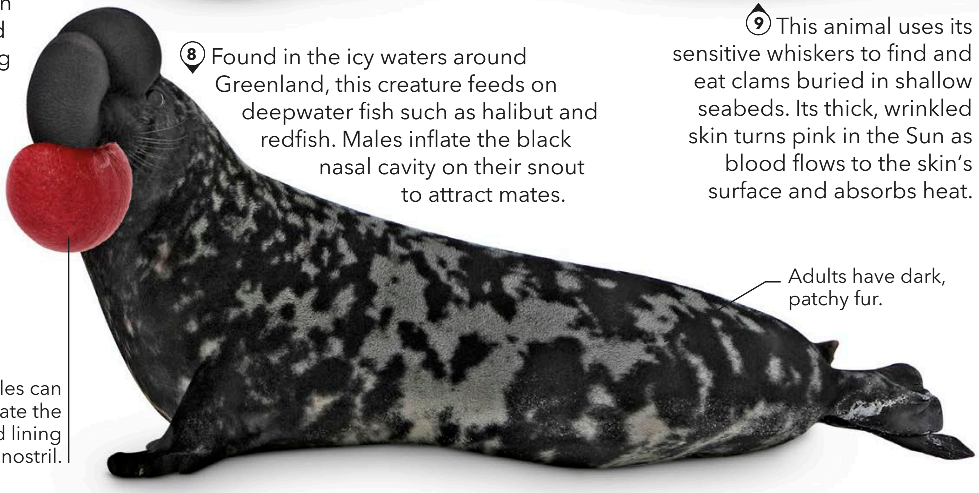


Up to 90 cm (35½ in) long, the ivory tusks are used to climb onto ice.



⑦ Also called *el lobo marino* in Spanish, meaning "sea wolf", this sociable South American animal makes a sound similar to the barking of a dog.

Long flippers help it walk on the shore.

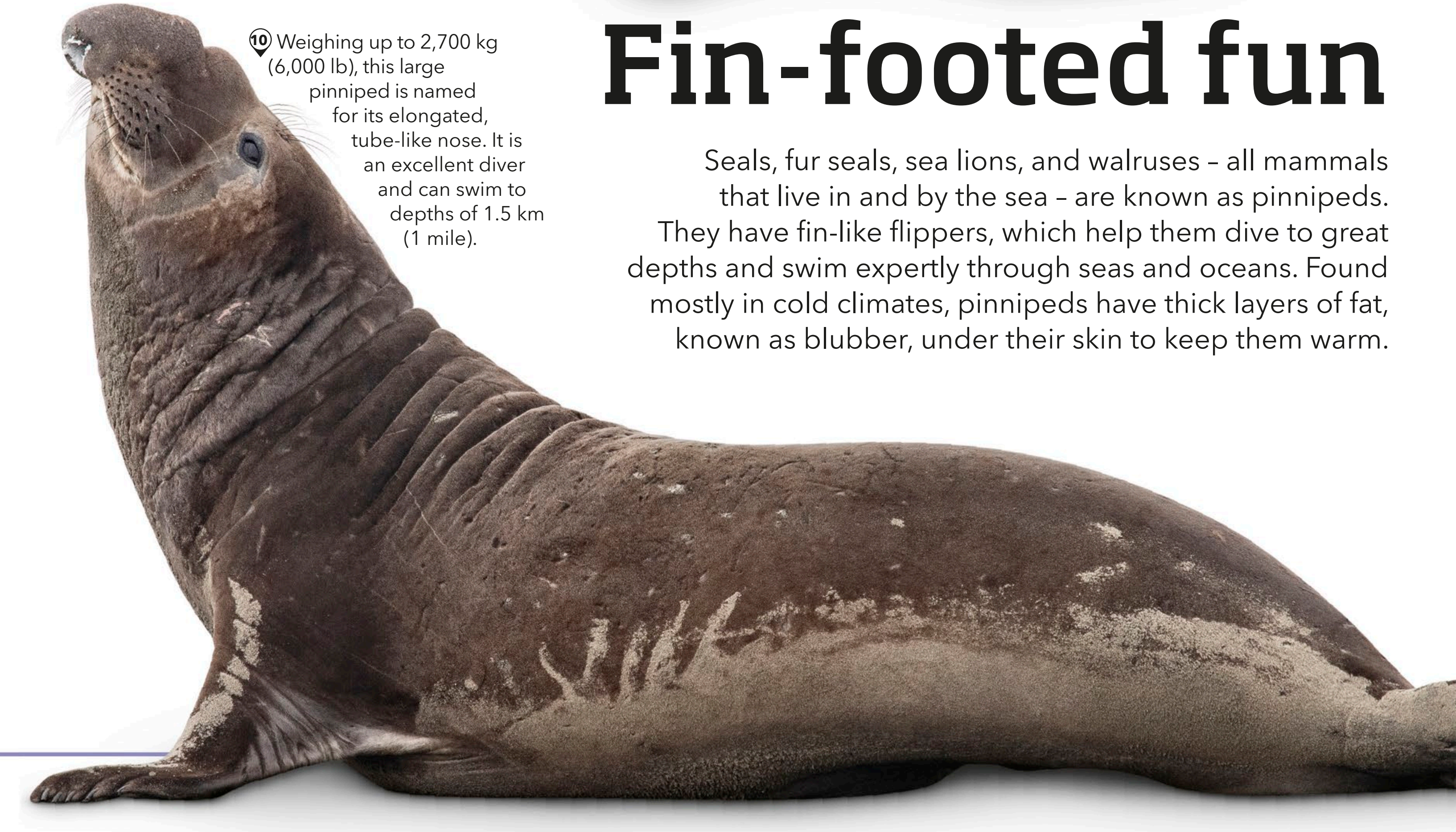


⑧ Found in the icy waters around Greenland, this creature feeds on deepwater fish such as halibut and redfish. Males inflate the black nasal cavity on their snout to attract mates.

Males can also inflate the stretchy red lining of one nostril.

Adults have dark, patchy fur.

⑨ This animal uses its sensitive whiskers to find and eat clams buried in shallow seabeds. Its thick, wrinkled skin turns pink in the Sun as blood flows to the skin's surface and absorbs heat.



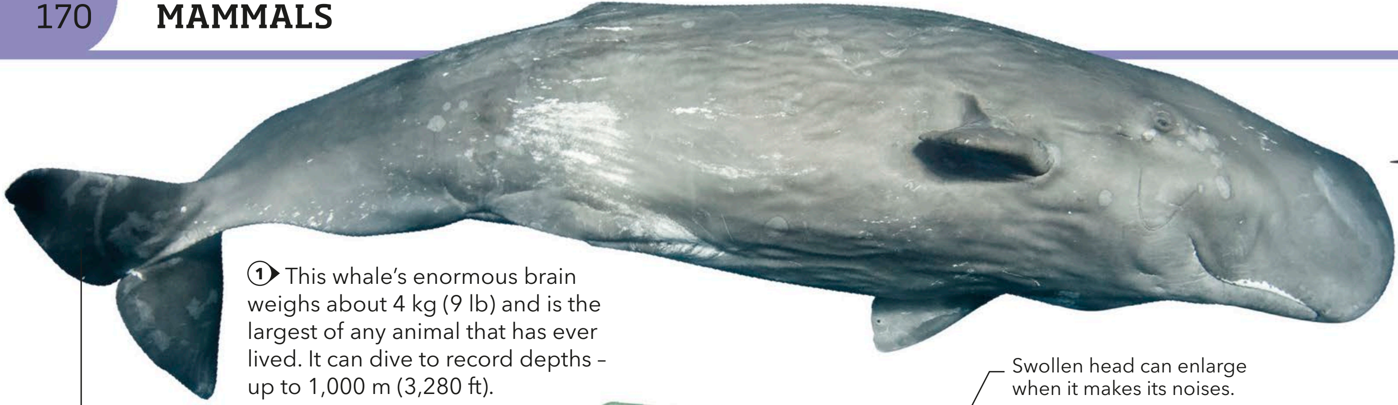
⑩ Weighing up to 2,700 kg (6,000 lb), this large pinniped is named for its elongated, tube-like nose. It is an excellent diver and can swim to depths of 1.5 km (1 mile).

Fin-footed fun

Seals, fur seals, sea lions, and walruses – all mammals that live in and by the sea – are known as pinnipeds. They have fin-like flippers, which help them dive to great depths and swim expertly through seas and oceans. Found mostly in cold climates, pinnipeds have thick layers of fat, known as blubber, under their skin to keep them warm.

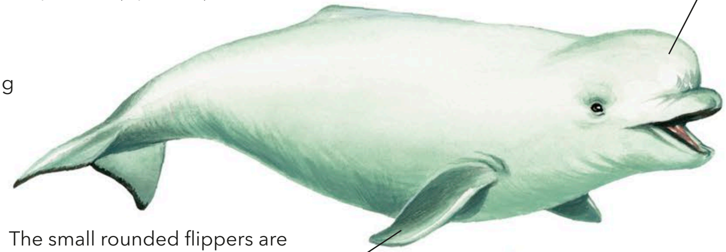
Whales and dolphins

Some of the largest animals that have ever existed are whales and dolphins, together known as cetaceans. These air-breathing aquatic mammals inhabit every ocean in the world and are perfectly adapted to life at sea. With long, slender bodies and powerful tails, they can travel through the water at incredible speeds.



① This whale's enormous brain weighs about 4 kg (9 lb) and is the largest of any animal that has ever lived. It can dive to record depths – up to 1,000 m (3,280 ft).

Tail flippers measuring 5 m (16 ft) drive it through the water.



② Living in the Arctic Ocean, this white whale keeps in contact with its pod with a range of noises, including barks, chirps, grunts, squeaks, and moos.

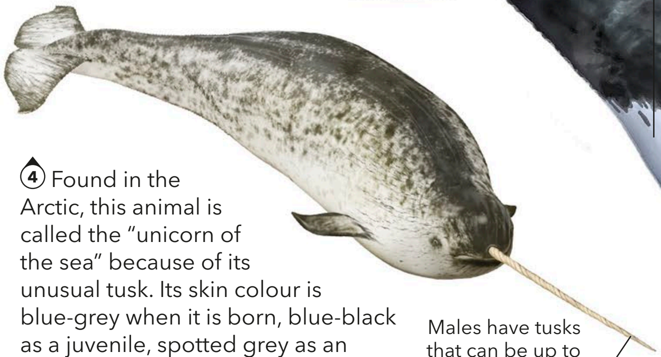
Swollen head can enlarge when it makes its noises.

The small rounded flippers are used for steering, as it drives itself along with its tail.

Long flippers can grow up to 5 m (16 ft) long.

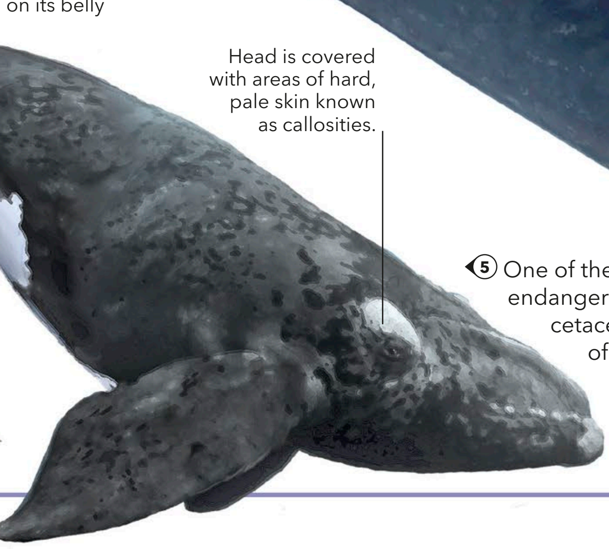
③ This animal is not only the largest whale, but also the largest animal to have ever lived. It can measure up to 32 m (105 ft).

Its powerful tail fins, called flukes, allow the whale to swim at 50 km/h (31 mph) through the water.



④ Found in the Arctic, this animal is called the "unicorn of the sea" because of its unusual tusk. Its skin colour is blue-grey when it is born, blue-black as a juvenile, spotted grey as an adult, and white when it is old.

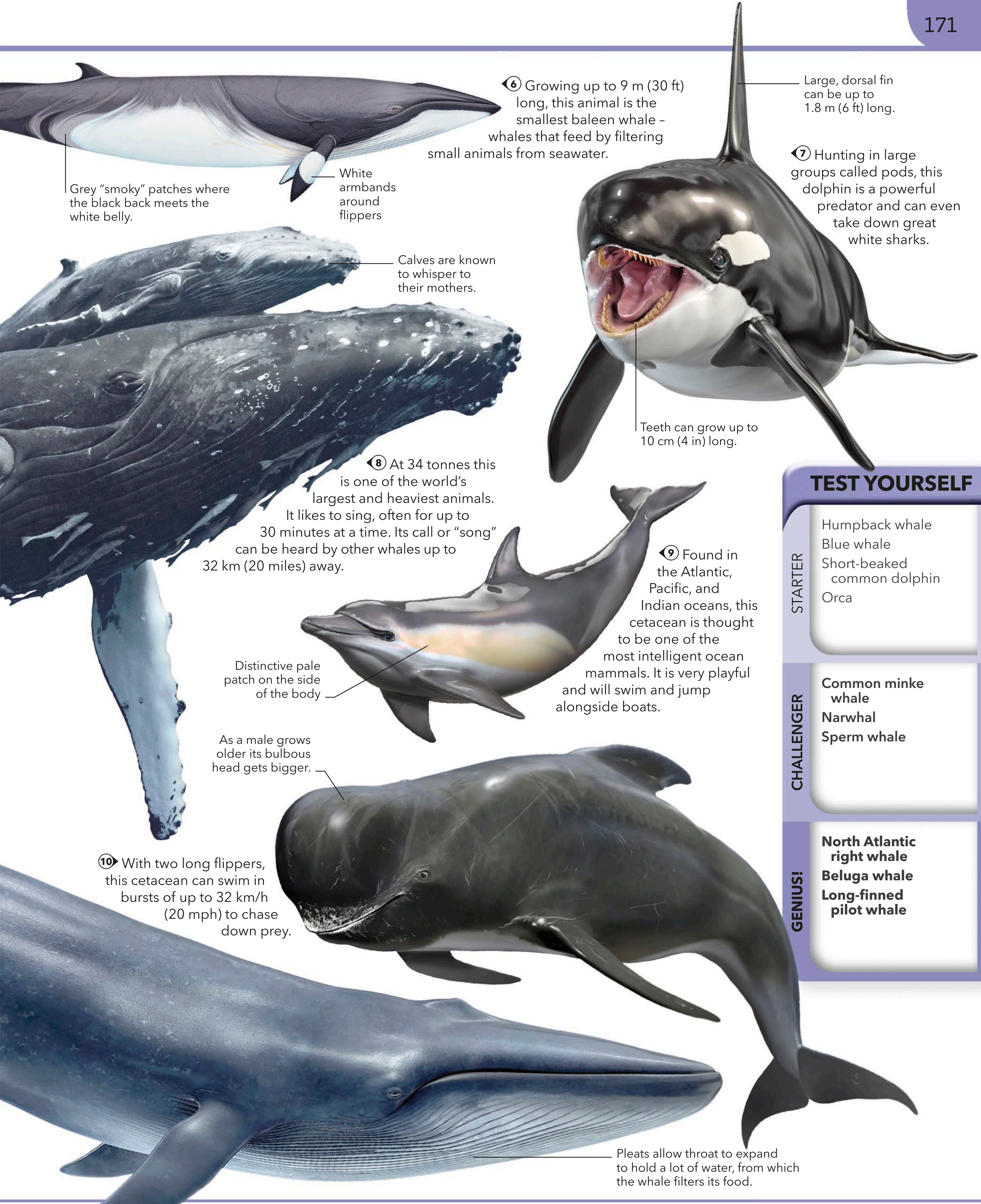
Males have tusks that can be up to 3 m (10 ft) long.



⑤ One of the most endangered whales, this cetacean leaps out of the water and slaps its tail against the surface – despite its mighty size at up to 14 m (46 ft) long.

White markings on its belly

Head is covered with areas of hard, pale skin known as callosities.



⑥ Growing up to 9 m (30 ft) long, this animal is the smallest baleen whale – whales that feed by filtering small animals from seawater.

Grey "smoky" patches where the black back meets the white belly.

White armbands around flippers

⑦ Hunting in large groups called pods, this dolphin is a powerful predator and can even take down great white sharks.

Large, dorsal fin can be up to 1.8 m (6 ft) long.

Teeth can grow up to 10 cm (4 in) long.

⑧ At 34 tonnes this is one of the world's largest and heaviest animals. It likes to sing, often for up to 30 minutes at a time. Its call or "song" can be heard by other whales up to 32 km (20 miles) away.

Calves are known to whisper to their mothers.

⑨ Found in the Atlantic, Pacific, and Indian oceans, this cetacean is thought to be one of the most intelligent ocean mammals. It is very playful and will swim and jump alongside boats.

Distinctive pale patch on the side of the body

⑩ With two long flippers, this cetacean can swim in bursts of up to 32 km/h (20 mph) to chase down prey.

As a male grows older its bulbous head gets bigger.

Pleats allow throat to expand to hold a lot of water, from which the whale filters its food.

TEST YOURSELF

STARTER

- Humpback whale
- Blue whale
- Short-beaked common dolphin
- Orca

CHALLENGER

- **Common minke whale**
- **Narwhal**
- **Sperm whale**

GENIUS!

- **North Atlantic right whale**
- **Beluga whale**
- **Long-finned pilot whale**

ANSWERS: 1. Sperm whale 2. Beluga whale 3. Blue whale 4. Narwhal 5. North Atlantic right whale 6. Common minke whale 7. Orca 8. Humpback whale 9. Short-beaked common dolphin 10. Long-finned pilot whale

Index

A B

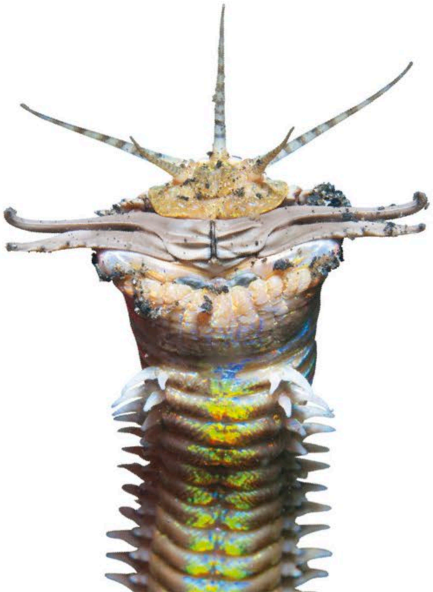
alligators 86–87
alpacas 164–65
amphibians 10, 65, 66–67
  eggs and young 72–73
  frogs and toads 68–69
  salamanders and newts 70–71
anemones 22–23
antelope 122–23, 160–61
antennae 42
antlers 160
ants 39, 46–47
apes 136–37
arachnids 36–37
arthropods 20
babies 124–25, 127
  see also eggs
badgers 152–53
basking 77
bats 146–47
beaks 100, 106–07
bears 148–49
bees 17, 39, 46–47
beetles 38, 40–41
big cats 150–51
birds 10, 89, 90–91
  beaks 106–07
  claws 112–13
  coastal birds 114–15
  ducks and geese 108–09
  feathers 98, 118–19
  flight 98–99
  flightless birds 92–93
  game birds 94–95
  nests and eggs 120–21
  owls 102–03
  parrots 96–97
  perching birds 90, 116–17
  raptors 104–05
  toucans and woodpeckers 100–01
  water birds 110–11
birds of prey 102–03, 104–05
bivalves 26
blubber 169
bones 12–13
bony fish 54, 58–59
breathing 11
bugs 38, 48–49
butterflies 38, 42–43, 44, 45

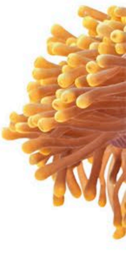
C

caecilians 66
caimans 86–87
camels 164–65
camouflage 50–51, 118
canines 144–45
carnivores 154
carrion 104
cartilaginous fish 54, 56–57
caterpillars 44
cats 150–51
cattle 160–61
cephalopods 30–31
cetaceans 166, 170–71
chameleons 76–77, 80–81
chimpanzees 136–37
clams 26–27, 29
claws 112–13
climate change 14
cnidarians 22–23
coastal birds 114–15
coats 140–41
coelenterates 20
colonies 39, 88–89, 121
comb jellies 22–23
conservation 16–17
coral reefs 8–9, 61
corals 22–23
courting 54–55, 90
coyotes 144–45
cranes 90
crickets 39
croaking 67
crocodiles 76, 86–87
crustaceans 34–35
cuttlefish 30–31

D E

deer 160–61
deforestation 14
disease 15
dogs, wild 144–45
dolphins 166–67, 170–71
donkeys 156–57
dragonflies 44–45
droppings 158–59





- ducks 108–09
- echinoderms 20, 32–33
- echolocation 143, 146
- eggs
  - amphibians 64–65, 72–73
  - birds 120–21
  - fish 55
  - insects 44
  - reptiles 76
- electric signals 143
- elephants 16–17
- elytra 40–41
- endangered animals 14–15, 16–17
- exoskeletons 13
- extinction 14–15, 16–17

F

- faeces 158–59
- feathers 98, 118–19
- feet 112–13, 116
  - *see also* hooved mammals
- fingers 136, 138
- fins 62–63, 169
- fish 10, 53, 54–55
  - bodies and fins 62–63
  - bony fish 54, 58–59
  - sharks and rays 54, 56–57
  - tropical 60–61
- fissipeds 166
- flamingos 88–89
- flies 39
- flightless birds 92–93
- food webs 11
- foxes 144–45
- frogs 66–67, 68–69
  - eggs and young 72–73
- fur 140–41

G H

- game birds 94–95
- gastropods 26–27
- geese 108–09
- gharials 86–87
- gibbons 136–37
- giraffes 122–23, 164–65
- gorillas 136–37
- grasshoppers 39
- hemipterans 48–49
- herbivores 154
- hogs 162–63
- hooved mammals 160–61, 164–65
  - horse family 156–57
  - pig family 162–63
- horses 156–57
- hummingbirds 98–99
- humps 164–65
- hymenoptera 46–47

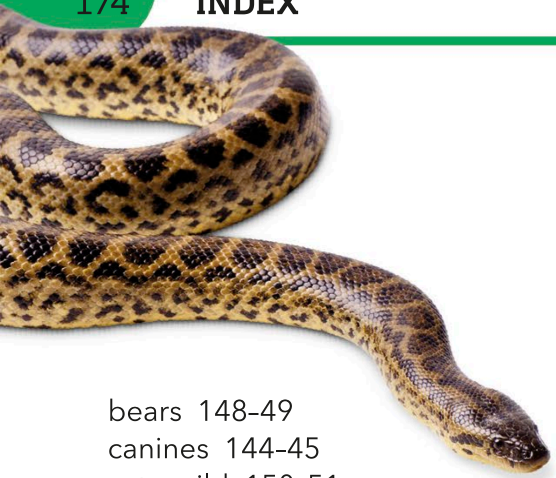
I J K

- iguanas 80–81
- insect-eating mammals 128–29
- insects 38–39, 44–45
  - bees, wasps, and ants 46–47
  - beetles 38, 40–41

  - bugs 38, 48–49
  - butterflies and moths 38, 42–43
  - camouflaged 50–51
- invertebrates 10, 13, 20–21
  - *see also* insects
  - arachnids 36–37
  - corals and jellies 20, 22–23
  - crustaceans 34–35
  - echinoderms 32–33
  - molluscs 26–27, 28–29, 30–31
  - worms 24–25
- jawless fish 54
- jaws 86, 131, 154–55
- jellyfish 10–11, 21, 22–23
- kangaroos 126–27
- keratin 141
- koalas 126–27

L M

- ladybirds 18–19, 40–41
- larvae 45
- legs 112–13
- lemurs 138–39
- leopards 150–51
- life cycles
  - insects 44–45
  - jellyfish 21
  - salamanders 67
- lions 142–43, 150–51
- lizards 76, 77, 80–81
- llamas 164–65
- mammals 10, 123, 124–25
  - apes 136–37
  - bats 146–47



bears 148–49
canines 144–45
cats, wild 150–51
coats 140–41
droppings 158–59
hooved 160–61, 164–65
horse family 156–57
insect eaters and sloths 128–29
marsupials 124, 126–27
monkeys 134–35
mustelids 152–53
nocturnal 142–43
ocean 166–67, 170–71
pinnipeds 168–69
pig family 162–63
rodents 130–31
tails 132–33
teeth and jaws 154–55
tree dwellers 138–39
mammals, ocean 166–67
  pinnipeds 168–69
  whales and dolphins 170–71
marsupials 124, 126–27
meat eaters 154
metamorphosis 44–45
migration 91, 167
mimicry 20, 50
molluscs 20, 26–27
  cephalopods 30–31
  seashells 28–29
monkeys 124–25, 134–35
monotremes 124
moths 38, 42–43
murmuration 99
mustelids 152–53

N O

narwhals 170–71
nautiluses 30–31
nests 120–21
newts 66, 70–71
nocturnal animals 142–43
non-perching birds 90
nymphs 44–45
ocean mammals 166–67
  pinnipeds 168–69
  whales and dolphins 170–71
octopuses 30–31
omnivores 154
opposable thumbs 136
orangutans 136–37
ostriches 92–93
otters 152–53, 167
overfishing 15
owls 102–03
oysters 28–29

P

pandas 148–49
parrots 96–97
passerines 116–17
  see also perching birds
peccaries 162
penguins 114–15
perching birds 90, 116–17
pesticides 15
pet trade 14
pigs 162–63
pinnipeds 166, 168–69
placental mammals 124
plant eaters 154
plumage 118–19
poaching 14, 16
polar animals 114

pollinators 38, 46
ponies 156–57
poo 158–59
pouched mammals 126–27
primates
  apes 136–37
  monkeys 134–35
  tree dwellers 138–39
pufferfish 54–55

R S

raptors 104–05
ratites 92–93
rays 56–57
reefs 8–9, 61
reptiles 10, 75, 76–77
  crocodilians 76, 86–87
  lizards 76, 77, 80–81
  scales 84–85
  snakes 76, 77, 82–83
  tortoises and turtles 76, 77, 78–79
rhinoceros 15
rodents 130–31
salamanders 66, 67, 70–71
  eggs and young 64–65, 72–73
scales 84–85
scavengers 104
scorpions 36–37
seabirds 91, 114–15
sea cucumbers 32–33
sea lions 168–69
seals 168–69
seashells 28–29
sea urchins 32–33
sharks 56–57, 60–61
shells
  invertebrates 26–27, 28–29, 34–35
  tortoises and turtles 76, 77, 78–79
sirenians 166
skeletons 12–13
skunks 152–53
sloths 128–29
slugs 26–27
snails 26–27, 29
snakes 74–75, 76, 77, 82–83
spiders 20–21, 36–37
spines (defences) 32–33, 140–41
spines (skeletons) 12–13
sponges 20, 22–23
squid 30–31
starfish 20, 32–33
stingrays 56–57
swans 108–09
swim bladder 58

T U V

tadpoles 72–73
tails 132–33
teeth 131, 154–55
tentacles 22–23
thumbs 136
tigers 150–51
toads 66, 68–69, 72–73
toes 116, 138
tortoises 76, 77, 78–79
toucans 100–01
tree-dwelling mammals 138–39
tropical fish 60–61
true bugs 38, 48–49
tuataras 76
turtles 76, 78–79
ungulates 162
vertebrates 12–13

W Y Z

wading birds 110–11
walruses 168–69
wasps 39, 46–47
weasels 152–53
webbed feet 112–13
whales and dolphins 170–71
whiskers 142
wild cats 150–51
wild dogs 144–45
wings
  birds 93, 99
  insects 39, 46
wolves 144–45
woodpeckers 100–01
worms 20, 24–25
young 124–25, 127
  see also eggs
zebras 122–23, 156–57

Acknowledgments

The publisher would like to thank the following people for their help with making this book: Ann Baggaley for proofreading; Elizabeth Wise for indexing; Ankita Gupta for editorial assistance; Nishwan Rasool and Vagisha Pushp for picture research; and Priyanka Sharma for the jacket.

Picture Credits

The publisher would like to thank the following for their kind permission to reproduce their photographs:

(Key: a-above; b-below/bottom; c-centre; f-far; l-left; r-right; t-top)

123RF.com: Vladislav Gajic 13cla, givaga 152fcl, Eric Isselee 97tr, 175br, Iakov Kalinin 62tl, Werayut Nueathong 39fbr, Theeraphan Satrakom 141cl, Elena Shchipkova / lenor 166clb, Thawat Tanhai 45cr, Ten Theeralerttham / rawangtak 22crb, Dennis van de Water 140tr. **Alamy Stock Photo:** AGAMI Photo Agency / Jari Peltomäki 105ca, Agefotostock / Berndt Fischer 128–129b, agefotostock / C.S. Bettencourt 112tr, Kelvin Aitken / VWPics 56tc, All Canada Photos / Tim Zurowski 5bc, 117bl, All Canada Photos / Wayne Lynch 77clb, David Allemand / Nature Picture Library 145tl, Carl Allen 99crb, Max Allen 152bl, Amar and Isabelle Guillen-Guillen Photo LLC 54cl, Ambling Images 104tr, 114bl, Heather Angel / Natural Visions 159clb, Animal Stock 26–27bc, Art Collection 3 43cl, Arterra Picture Library / Arndt Sven-Erik 106tc, De Meester Johan / Arterra Picture Library 29bl, Avalon.red / Stephen Dalton 48–49cb, Bel 73bl, Brian Bevan 69br, Biosphoto / Frederic Desmette 117crb, Biosphoto / Gerard Soury 57bl, Biosphoto / Steven Kovacs 20clb (Molluscs), Biosphoto / Sylvain Cordier 3tr, 111ca, Sergio Hanquet / Biosphoto 31tl, blickwinkel 39bc (beetle), blickwinkel / A. Hartl 58tl, blickwinkel / B. Trapp 37bl, blickwinkel / Hauke 143cr, blickwinkel / Hecker 155c, blickwinkel / Hecker / Sauer 24cl, blickwinkel / M. Woike 111b, blickwinkel / McPHOTO / A. Schauhuber 41tr, blickwinkel / McPhoto / KFU 147tr, blickwinkel / McPHOTO / LOV 86–87t, blickwinkel / McPHOTO / PUM 91br, blickwinkel / S. Gerth 100br, blickwinkel / Schmidbauer 160–161bc, blickwinkel / Teigler 26cb, Blickwinkel / Trapp 68br, Blue Planet Archive 24–25b, Blue Planet Archive SKO 22tc, Rick & Nora Bowers 114tc, Penny Boyd 162bl, Buiten-Beeld / Daniele Occhiato 99ca, Buiten-Beeld / Jelger Herder 69cla, 71tr, Rich Bunce 73tr, Carlos Villoch - MagicSea.com 62clb, Nigel Cattlin 49c, 49cb, cbpix 27tr, Jenna Chamberlain 80tl, David Chapman 158crb, Helmut Corneli 10–11, 22bc, 34b, Andrew Darrington 46bc, Dave Watts 150bl, David Tipling Photo Library 73tl, 98–99t, DeGe Photo 143tc, E.R. Degginger 64–65, Dembinsky Photo Associates / Skip Moody 105tl, 130tr, Design Pics Inc / Thomas C. Kline, Jr. 59br, Martin Dohrn / Nature Picture Library 142–143b, Andrew DuBois 85crb, Holger Ehlers 93bl, Kevin Elsby 113tl, ephotocorp / Hrishikesh Karandikar 67tr, ephotocorp / Zeeshan Mirza 51crb, David Fleetham 31ca, 33cra, Tim Fleming 134cl, FLPA 72cr, Fotograferen.net 55cra, Lincoln Fowler 133cra, georgesanker.com 149tr, Robert German 14tl, Bernhardt Reiner / Prisma by Dukas Presseagentur GmbH 162–163tc, Jane Gould 56tl, Bill Gozansky 94bc, 163tc, Ken Griffiths 80–81b, Nathan Guttridge 105bl, Steve Hamblin 43tr, Andy Harmer 44–45b, Frank Hecker 56br, 159cla, Chicurel Arnaud / hemis.fr 60ca, Jared Hobbs / All Canada Photos 147tl, Doug Horrigan 80cl, Sean Hunter 152tl, Scott Hurd 112bl, Image Professionals GmbH / Konrad Wothe 96cl, Image Source / Alexander Semenov 25ca, imageBROKER / Christian Hütter 105tc, imageBROKER / Gerry Pearce 127cr, imageBROKER / Marko König 96tl, imageBROKER / Norbert Probst 63tl, J.W.Alker / imageBROKER 31cr, Joe McDonald / Steve Bloom Images 3tl, 125bl, 145tr, Rebecca Jackrel 94tc, Jon Arnold Images Ltd 93tl, Juniors Bildarchiv GmbH 156tl, 174b, Juniors Bildarchiv GmbH / F259 76cl, Juniors Bildarchiv GmbH / F309 97crb, Dave Keightley 101ca, Rolf Kopfle 94bl, Steven Kovacs / Biosphoto 26tl, Ivan Kuzmin 147br, Emmanuel Lattes 39fcla, William Leaman 91tc, Alex Mustard / Nature Picture Library 168c, Jeff Rotman / Nature Picture Library 61bl, Life on white 111cra, Doug Lindstrand / Design Pics Inc 149c, Lazydays Liz 121bl, Colin Marshall 58clb, Tim Mason 112cb, Nobuo Matsumura 62cla, 119cla, Chris Mattison / Nature Picture Library 10clb, mauritius images GmbH / Ronald Wittek 127tr, Robert McGouey / Wildlife 160bl, McPhoto / Rolf Mueller 153cra, Anthony Mercieca / Dembinsky Photo Associates 103cla, Stephen Miller 152cl, Olivier Miniato / Biosphoto 39cb, Richard Mittleman / Gon2Foto 167cr, Jeff Mondragon 55br, National Geographic Image Collection / Brian J. Skerry 78–79b, Natural History Museum, London 49crb, Nature Photographers Ltd / Paul R. Sterry 54tl, Nature Picture Library 17tc, 25cla, 58cb, 72–73b, 158clb, Nature Picture Library / Andrew Walmsley 139tr, Nature Picture Library / Anup Shah 134bl, Nature Picture Library / Guy Edwardes 68tl, Nature Picture Library / John Abbott 47tl, Nature Picture Library / Konrad Wothe 40cr, Nature Picture Library / Lucas Bustamante 41br, Nature Picture Library / Mark Payne-Gill 72tl, Nature Picture Library / Michael D. Kern 50tr, Nature Picture Library / Pete Oxford 56–57c, Nature Picture Library / Rolf Nussbaumer 68cr, S C Bisserot / Nature Photographers Ltd 146br, Naturepix 92c, Andrey Nekrasov 20cl, 23c, 33bl, Pete Niesen 32bl, NOAA 31clb, Paulo Oliveira 57tc, 59tr, 59bl, P&F Photography 86–87b, Papilio / Robert Pickett 35bl, 50crb, Petographer 80clb, Toni Pfaffenbauer / imageBROKER 142tr, Pixels of Nature 51tr, Premaphotos 50tc, George Reszeter 91cb, Bryan Reynolds 48clb, Robertharding / Louise Murray 134tl, William Robinson 117br, Rolf Nussbaumer Photography / Stefan Huwiler 96br, Rolf Nussbaumer Photography / Thomas Marent 48l, Scenics & Science 34cla, Malcolm Schuyl 46bl, Science History Images 128tr, Science Photo Library 44t, Scubazoo 11cr, Scubazoo / RGB Ventures / SuperStock 3clb, 27cla, Martin Shields 50l, Anton Sorokin 46tl, Inga Spence 154cb, Paul R. Sterry / Nature Photographers Ltd 28tc, Steve Bloom Images 125bc, Beth Swanson 62–63b, tbkmedia.de 114cla, Tierfotoagentur / T. Harbig 121br, Genevieve Vallee 92ca, Chris Wallace 115c, WaterFrame_dpr 60cr, WaterFrame_fur 20clb, 23bl, 60tc, 60cl, Michael Weber / imageBROKER 144bl, WENN Rights Ltd 67br, WILDLIFE GmbH 62tr, 94cra, 169cr, 172tr, Tony Wu / Nature Picture Library 170–171c, Konrad Zelazowski 121cra, Zoonar GmbH / Pavlo Vakhrushev 58c, ZUMA Press, Inc. 163ca. **Ardea:** imagebroker.com / Juergen & Chri 150cl, Augusto Leandro Stanzani 166–167, Joanna Van Gruisen 161ca. **Dorling Kindersley:** Thomas Marent 42tl, Thomas Marent 43cla, Thomas Marent 43br, Chris Mattison Nature Photographics 78c, Andrew Beckett (Illustration Ltd) 110br, 117tr, 127ftr, 135tc, 137tl (branch), 137bc, 145cr, Geoff Brightling / Booth Museum of Natural History 12–13c, Chris Gomersall Photography 94cb, Cotswold Wildlife Park & Gardens, Oxfordshire, UK 135tr, Philip Dowell / Natural History Museum, London 12cra, 121tl, Terry Goss 57cb, Colin Keates / Natural History Museum 12cb, 12b, 12–13b, Twan Leenders 71c, 78tl, 83tl, Richard Leeney / Whipsnade Zoo 96–97t, Natural History Museum, London 2tr, 2ftl, 42clb, 42bl, 43c, 133bc, Natural History Museum, London / Harry Taylor 35tc, Linda Pitkin 32tc, Lynette Schimming 39br, Kim Taylor / Natural History Museum, London 121tc, 121cla (chicks), 121ca, Wildlife Heritage Foundation, Kent, UK 150tc, Jerry Young 26cr, 43bl, 69clb, 77tc, 77tr, 78cb, 86c, 146clb, 156tr. **Dreamstime.com:** Agami Photo Agency 132tl, Agdbeukhof 4ftl, 110cb, Akvals 32tl, Allexxandar 62cra (background), Almir1968 55cra (Underwater), 55crb, Greg Amptman / Thediver123 57tr, Amwu 36bl, 78bl, 79tl, 79cr, 96c, Annaav 145crb, Artushfoto 145br, Andrew Astbury 124fbr, Auris 20clb (grass), Avslt71 99cr, Rinus Baak 118tl, Tatiana Belova 59ca, Ben 95clb, Birdiegal717 107ca, Karel Bittner 33tr, Lukas Blazek 126bl, 131b, 153cla, Bobhilscher 76bl, David Burke 154cr, Barbara Burns 38fcra, Steve Byland 106bl, Jeremy Campbell 29bc, Cathywithers 132tc, Vladimir Cech 145clb, Cherdchai Chaivimol 47b, Mun Lok Chan 101tc, Chernetskaya 147ftr, Coconutdreams 29crb, Shubhrojyoti Datta 97tc, Davthy 164c, Digitalimagined 47br, 47b (black ants), Dimarik16 141tr, Miloslav Doubrava 90clb, Dreamzdesigner 14br, Ecophoto 139br, Elantsev 14ftl, EPhotocorp 37tr, 82br, Dirk Ercken 67cr, Rudolf Ernst 93cra, 109ca, Farinoza 70clb, 138tr, Feathercollector 144c, Nicolas Fernandez 26bl, Phil Feyerabend 108tl, Gerald Robert Fischer 25tr, FlorianAndronache 110tl, Svetlana Foote 14tr, 124bl, Forest71 37cb, Fotomicar 161cr, Domiciano Pablo Romero Franco 39ca, Aleksandr Frolov 164tl, Charles Gibson 165ca, Godruma 11bc, Golfxx 62cra, Natalia Golovina 93b, Joaquin Gonzalez Gomez 104bl, Grotmarsel 26cra, Andrey Gudkov 121bc, Gillian Hardy 4tl, 137cl, Alexander Hasenkampf 47c, 48cra, David Havel 139tc, 175tl, Hel080808 99br, Vasyl Helevachuk 118cr, Moose Henderson 104cla, 113cr, Henrikhl 37cr, Mikael Holgersson 84br, Hvat10 157c, Isselee 4–5bc, 5tc, 35ca, 35cl, 36–37t, 38cra, 39cra, 60cra, 68clb, 68bl, 69tr, 71bc, 86–87ca, 92br, 96bl, 97bc, 119c, 121cla, 129cla, 131ca, 153br, 173cra, Roman Ivaschenko 38ca, Izanbar 61cr, 166cl, Jayone1981 155crb, Vladislav Jirousek 137tc, 149bc, Jnjhuz 130cl, John braid / Johnbraid 4–5tc, 43cb, Jens Stolt / Jpsdk 42tr, Jsanerkin 157bl, Karin59 160cl, Katephotographer 83br, Kengriffiths6 82clb, Klaphat 140cla, Klomsky 85tr, KMWphotography 141bl, Tetiana Kolubai 48c, Tetiana Kovalenko 139tc (Leaves), Denis Kovshutin 36crb, Matthijs Kuijpers 4cra, 70bl, 78tr, 79cla, Dalia Kvedaraite 135bc, Kwiktor 92l, Thomas Langlands 140cb, Leerobin 81crb, Tom Linster / Flinster007 148tl, Chris Lorenz 107bl, Lucaar 145c, Lunamarina 132–133bc, Luna Vandoorne Vallejo / Lunavandoorne 125br, Lars S. Madsen 41c, Suvit Maka 15tc, Aliaksandr Mazurkevich 124tl, Mealmeaw 125fbl, Martin Mecnarowski 105br, Sander Meertins 102tc, Katho Menden 2c, 157tl, Joseph Mercier 14ftr, Mikelane45 5cla, 90cl, 105cb, 130clb, 131tl, Simonas Minkevičius 108tc, Mirecca 59c, Natakuzmina 35clb, Luca Nichetti 138bl, Duncan Noakes 2ca, 40crb, Andy Nowack 20cla, Office2005 84clb, Okea 68cr (water), Matthew Omojola 4br, 42br, Jason Ondreicka 71clb, Mohamed Osama 124cl (Underwater), Chansom Pantip 136tc (branch), Yuri Parmenov Yuri Parmenov 120bc, 120br, Pecak 136tl, Martin Pelanek 66bc, 101br, Phassa 158cr, Photobee 49cla, Picstudio 115br, Picture.jacker 124bc, Pincarel 39bc, Pipa100 24tl, Verabutr Piriyanontana 76clb, Planetfelicity 58b, Elena Podolnaya 58crb, Alain Poirot 138–139c, Stu Porter 162ca, Ondřej Prosický 10clb (bird), 103ca, 104clb, Denisa Prouzová 141ca, Daniel Prudek 161tr, Penchan Pumila 63crb, Subin Pumsom 141crb, Pzaxe 4bc, 41cr, Constantinoff Richard 107br, Jasper Rimpau 27br, David Roberts 168–169c, Jonas Rönnbro 108cr, Stefan Rotter 112tc, Juan Carlos Martínez Salvadores 107clb, Sarah2 37clb, Scheriton 140cl, Juergen Schonnop 10cla, Seadam 33crb, Visa Sergeiev 155clb, Alexander Shalamov 113cl, Peter Shaw 112cla, Kai Shen 108bl, Skalapendra 11br, Slowmotiongli 66bl, 96crb, 104tc, 116clb, 134cra, 136tc, 153tr, 166tl, Smellme 157clb, Aleksey Solodov 32tr, Stillwords 155tl, John Stocker 160ca, Stripe1964 29cr, Stuartan 108br, Stubblefieldphoto 63br, Kasira Suda 41ca, I Wayan Sumatika 39cl, Sergey Taran 84cra, Piyapong Thongdumhyu 24tr, Dimitar Tzankov 114cl, Sergey Uryadnikov 156b, Vaeenma 146tl, Vicki Vale 29cb, Veronika Verenin 106bc, Victortyakht 117tl, Vasiliy Vishnevskiy 130c, Viter8 27cr, 40ca, 78cra, Natalia Volkova 127b, Vrabelpeter1 85ca, Aekkaphum Warawiang 76crb, Sarayut Watchasit 5ca, 22clb, Yael Weiss 125cra, Buddee Wiangngorn 28b, Ivonne Wierink 15tl, Wiltding 15cr (background), Wirestock 76clb (Turtles), William Wise 129c, Marcin Wojciechowski 160tr, Cezary Wojtkowski 161tl, Wrangel 58tr, 157br, 159cr, Vladimir Melnik / Zanskar 169tr, Zhbampton 40cl. **FLPA:** BIA / Alan Murphy 100tl, Dembinsky Photo Ass. 128bl, Kevin Elsby 163cr, Michel Gunther 163b, Daniel Heuclin / Biosphoto 143br. **Getty Images:** 500px / BP Chua 108–109t, 500px / Martin Anderson 36cla, 500Px Plus / Jelly Fish 18–19, 500Px Plus / Tony Beck 95tr, AFP / Yasuyoshi Chiba 16–17b, AGAMI stock 109c, Enrique Aguirre Aves 169b, Sjoerd Bosch 115t, Corbis Documentary / Arthur Morris 110bl, Corbis Unreleased / Frans Lemmens 126tl, Gerald Corsi 152–153bc, Cultura / Rodrigo Friscione 58–59c, De Agostini / DEA / C.Dani / I. Jeske 134bc, DigiPub 5tr, 29tl, Georgette Douwma 61br, Troup Dresser 39c, Rohit Kushwah / EyeEm 124–125, Gamma-Rapho / Dave Watts 116cl, Gamma-Rapho / Sylvain Cordier 45tr, H Photos / EyeEm 155cla, James Hager 133tl, Ken Kiefer 2 56ca, Raimund Linke 2fcla, 137c, Alexander Safonov / Barcroft Media 60b, Moment / © Juan Carlos Vindas 119tc, Moment / Amith Nag Photography 8–9, Moment / Artur Carvalho 88–89, Moment / Floridapfe from S.Korea Kim in cherl 134–135b, Moment / Joao Paulo Burini 36tr, Moment / Larry Keller, Lititz Pa. 98–99b, Moment / Stan Tekiela Author / Naturalist / Wildlife Photographer 129tc, Andrey Nekrasov 30cl, 59tl, Photodisc / Ken Usami 34tr, Photographer's Choice RF / Barry Kusuma 3br, 81t, Photographer's Choice RF / Ronald Wittek 119bc, RooM / shikheigoh 76–77c, Sumiko Scott 38b, Paul Starosta 158c, The Image Bank / Martin Harvey 122–123, Universal Images Group / Education Images / David Tipling 95crb, Vicki Jauron, Babylon and Beyond Photography 151tr, Nimit Virdi / 500px 151b, Westend61 102tl. **Getty Images / iStock:** aaprophoto 130br, adogslifephoto 134c, aedkais 107tl, AGAMI stock 119clb, al_la 165tr, anankkml 150cra, Andreygudkov 150c, Antagain 97ca, 97cra, barbaraaaa 119crb, BirdImages 106br, blueringmedia 67tl, Neil Bowman 93ca, brentawp 4tc, 116tc, cellistka 82–83c, 174tl, chaiyon021 135cra, chris2766 102–103t, clark42 125cr, Catherine Withers-Clarke 118tr, Cloebudgie 158bl, CraigRJD 144br, cynoclub 97clb, DarrenMower 33tl, DavidByronKeener 108cb, davidevison 142ftl, Denja1 54cla, Dgwildlife 116tl, DKart 138cl, drakuliren 117c, E+ / 33karen33 115cl, E+ / animatedfunk 49tc, E+ / DieterMeyrl 2tl, 94ca, E+ / Gannet77 164cl, E+ / KeithSzafranski 2cla, 114tr, E+ / Zocha_K 106cl, eastriverstudio 159ca, EcoPic 142tl, ePhotocorp 101clb, Farinosa 81tr, GlobalP 4cra (fox), 48ca, 71tl, 81cla, 84–85c, 129tr, 144tr, Goddard_Photography 162cr, hugy 155tr, italiansight 10c, JackVandenHeuvel 110–111t, JensenChua 92–93t, JimGallagher 136tr, jkauffeld 17br, Joesboy 47crb, johnandersonphoto 23bc, 23br, kajornyot 106cb, Kaphoto 47clb, KenCanning 144–145c, kojihirano 46cla, Zoran Kolundzija 106cr, Mark Kostich 83tr, leonello 124cla (Platypus), Enrique Ramos Lopez 100–101t, marrio31 61clb, MattCuda 119cra, mauribo 115tl, mdesigner125 103br, MichaelStubblefield 61tr, namibelephant 159tc, Enrico Pescantini 128tc, PetlinDmitry 82tr, PhanuwatNandee 95br, alessandro_pinto 165clb, reptiles4all 74–75, 85bl, richcarey 83c, Dwi Septiyana 94br, Simoneemanphotography 133cr, skynesher 154clb, slowmotiongli 131tr, StockPhotoAstur 101tr, Sundry Photography 84ca, taviphoto 161cl, Lillian Tveit 137br, USO 90–91b, Martin Voeller 70cb, wholden 165tl, Albert Wright 118ca, Michael Zeigler 166cla. **naturepl.com:** Ingo Arndt 28cb, Emanuele Biggi 47ca, Bernard Castelein 2clb, 111clb, 138bc, Nigel Cattlin 26tc, Jordi Chias 169tl, 170t, Stephen Dalton 36tl, 36br, Sue Daly 30bl, Richard Du Toit 158tl, 161br, Michael Durham 63clb, Guy Edwardes 102bl, 114tl, David Fleetham 57ca, Michael & Patricia Fogden 66clb, 69tl, Steve Gettle 110crb, Edwin Giesbers 148br, Doug Gimesy 132cl, Chris Gomersall / 2020VISION 47cl, Melvin Grey 68tr, Shane Gross 30cr, Erlend Haarberg 115cb, Brent Hedges 135cb, Daniel Heuclin 82–83bc, 138tl, Klein & Hubert 131cra, Denis-Huot 165b, Alex Hyde 50cra, 51cb, Ernie Janes 5ftr, 47tr, Hilary Jeffkins 73crb, Chien Lee 129cb, Will Burrard-Lucas 130tl, Malleefowl 95bc, Roy Mangersnes 121cb, Bence Mate 102cb, MYN / Gil Wizen 36ca, MYN / Javier Aznar 82cl, MYN / Lily Kumpe 40tc, Piotr Naskrecki 146c, Nature Production 38cra (Bombardier), 54–55b, Greg Oakley 102br, Gary Bell / Oceanwide 31c, Pete Oxford 85c, David Pattyn 116tr, Doug Perrine 55cr, Loic Poidevin 20–21c, 116bl, Premaphotos 51clb, Andy Rouse 136bl, Tui De Roy 1cb, 115bl, 167cra, Phil Savoie 38cla, 38cl, 38cr, 38br, Scotland: The Big Picture 91cl, 113tr, Roland Seitre 130cr, Anup Shah 136cr, Shattil & Rozinski 152tr, Igor Shpilenok 159bl, Kim Taylor 10tl, 22br, 69cra, Andy Trowbridge 97cla, Markus Varesvuo 109tc, Colin Varndell 159tl, Marion Vollborn / BIA 109br, Dave Watts 91tl, Tony Wu 21br. **Reuters:** Stringer 39tr. **Robert Harding Picture Library:** Tom Campbell 33cla, Patrick Frischknecht 153cr. **Science Photo Library:** Dr. John Brackenbury 48tr, Dante Fenolio 73ca, Leonard Rue Enterprises 155bl, Merlintuttle.org 146tr, Gilles Mermet 28tl, Piotr Naskrecki / Nature Picture Library 154br, B. G Thomson 147cra. **Shutterstock.com:** aaltair 25tl, Kurit afshen 66–67c, Stacey Ann Alberts 120, Aleksei Alekhin 20bl, ananth-tp 10cl, AP / Frank Glaw 77cra, Aumsama 148tr, Bildagentur Zoonar GmbH 70tr, bluecrayola 107tc, Mark Brandon 39clb, 40tr, Vladimir Cech 149crb, Jesus Cobaleda 41bl, Richard Constantinoff 118cl, Curioso. Photography 132–133tc, emperorcosar 149tl, Federico.Crovetto 72ca, Sanit Fuangnakhon 40b, GraphicRN 152cb, Nikolas Gregor 51bl, ichywong 157tr, imageBROKER.com 162br, Eric Isselee 86tl, 132clb, Matt Jeppson 77br, Vladislav T. Jirousek 151clb, JonathanC Photography 151cla, Breck P. Kent 26–27tc, Jean Landry 109cla, Fabio Maffei 66br, Fauzan Maududdin 16–17ca, Christian Musat 164r, Serkan Mutan 110tc, Mircea Negulici 108cra, Jesse Nguyen 116–117c, Zaruba Ondrej 135ca, Marieke Peche 51cla, James Marvin Phelps 133br, PhotocechCZ 160cr, Francesco_Ricciardi 24cra, S. Aratrak 159br, sakhorn 84–85t, Shpatak 55tr, Sandra Standbridge 51tl, Rostislav Stefanek 22bl, Marek R. Swadzba 49tr, TCreativeMedia 111tc, unterwegs 26bc, Anton Watman 10bl, Milan Zygmunt 103c. **SuperStock:** Age Fotostock / Colin Marshall 25bc, 172bl, Stephen Belcher / Minden Pictures 15b, BIA / Minden Pictures / Alan Murphy 100bl, Biosphoto 13crb (x3), 154tc, Biosphoto / Ignacio Yufera 100cla, D. Parer & E. Parer-Cook / Minden Pictures 140br, Suzi Eszterhas / Minden Pictures 140ca, Michael & Patricia Fogden / Minden Pictures 14cr, CORDIER Sylvain / Hemis 168tl, Imagemore 41tl, juniors@wildlife Bildagentur G / Juniors 148bl, Hiroya Minakuchi / Minden Pictures 132b, Minden Pictures / Stephen Belcher 35br, Minden Pictures 46r, 52–53, Minden Pictures / Buiten-beeld / Henny Brandsma 111cb, Minden Pictures / Michael & Patricia Fogden 128tl, Minden Pictures / Mitsuhiko Imamori 45ca, Minden Pictures / Stephen Dalton 50bc, NHPA 127bc, 139cb, Pacific Stock - Design Pics / Dave Fleetham 20ca, Pantheon / Elizabeth Bomford 72tr, Steve Downeranth / Pantheon 30br, Kevin Schafer / Minden Pictures 124cl, Michael Durham / Minden Pictures 124br, Tui De Roy / Minden Pictures 168tr, Universal Images Group 31br, ZSSD / Minden Pictures 163cl. **Unsplash:** Luke Tanis / @saluken 142ftr

All other images © Dorling Kindersley
For further information see: www.dkimages.com